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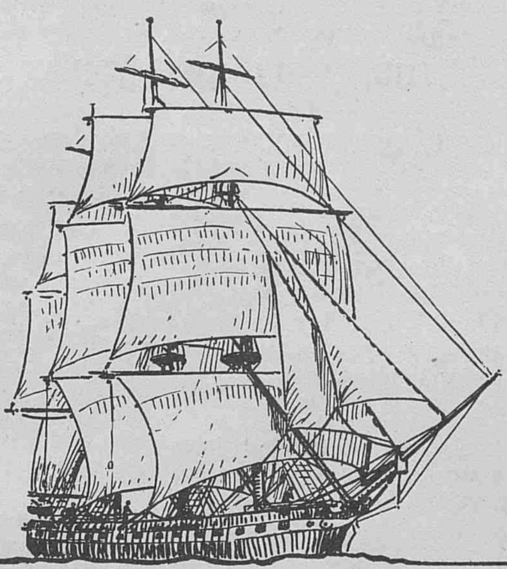


VOL. XIII, No. 121.

THE MARINE OBSERVER

JANUARY 1936.

TABLE OF PRINCIPAL CONTENTS

PAGE

The Passing of a Great Seaman 2

The Marine Observer 1936 3

The Marine Observer's Log :—

January, February and March 4

Captain JAMES COOK, by Commander CRESSWELL, R.N.R. ... 10

Rainbows and Fog Bows, by E. W. BARLOW, B.Sc. 15

Comparison of the Severity of the Weather in the North Atlantic during the last five Winters, by Captain L. A. BROOKE SMITH, R.N.R. 18

Weather in the North Atlantic, February 25th to 27th, 1935, by Commander J. HENNESSY, R.D., R.N.R. 21

Southern Ice Reports :—

January, February and March, 1935 23

Marine Meteorology and Safe Navigation 26

Wireless Weather Signals :—

Ships, Wireless Weather Signals 28

Wireless Stations Detailed to receive Routine Coded Weather Reports from " A Selected Ships " 32

PAGE

Wireless Weather Signals :—*cont.*

Wireless Stations Detailed to intercept Routine Coded Weather Reports from " B Selected Ships " 34

International Ships' Wireless Weather Telegraphy Code ... 36

Code Tables 37

Personnel :—

Captain JAMES GILLIES, C.B.E., ...
Captain F. W. HOLT, M.B.E., ...
Vice-Admiral Sir ROBERT MANSELL, K.C.V.O., C.B.E., ... } Retirements 40

Captain ROBERT GILMORE LATTA,
Captain A. R. H. MORRELL, } Appointments 40

Captain W. H. PARKER, C.B.E., R.D., R.N.R.,
Captain T. SPENCE, ... } Obituary 40

Lithographic illustrations after page 40 :—

Ships' Wireless Weather Signals, Chart of the World.

Currents in the South Pacific :—

November, December and January

Ice Chart of the Southern Hemisphere :—

January, February and March

31

THE PASSING OF A GREAT SEAMAN.

Admiral of the Fleet Earl Jellicoe, G.C.B., O.M., G.C.V.O., died on Wednesday, 20th November, 1935.

On the anniversary of the Armistice, 11th November, he caught a chill while attending the service at the Cenotaph in Whitehall. Next day he named an express railway engine of the London, Midland and Scottish Railway at Euston Station—British Legion. On 17th November he was obliged to cancel all his engagements.

On 25th November he was buried in the crypt of St. Paul's Cathedral alongside Nelson, whose grave is plumb under the centre of the dome, with Collingwood close to him.

Not one, but many of those who were in a position to know, have said that Jellicoe of Scapa had a vaster and more momentous responsibility than has ever been laid upon any Commander-in-Chief at any time in the history of England.

It should ever be remembered that in the early days of the Great War, Jellicoe had, with the full concurrence of the Board of Admiralty, determined only to join issue in a great fleet action under conditions which he, and not the enemy, should decide. The torpedo, the mine, and the submarine gave tactical advantages to a retiring fleet which the German Fleet had used, and Jellicoe had the courage not to play into their hands on the chance of a spectacular victory, for the greater probability was losses which would destroy the predominance of power for ultimate victory.

No man had ever tried more to fit himself for the command of a great fleet for the day of his country's need, nor had been given greater opportunity for so qualifying.

The great-grandson of Admiral Philip Paton, who was Second Sea Lord at the time of Trafalgar, and had served afloat under Boscawen and Hawke, and the son of a master mariner, Captain John Jellicoe, who commanded the ships of the Royal Mail Steam Packet Company up to the age of 70, then became a Director of the Company, and died in September, 1914, at the age of 90, thus seeing his son of whom he spoke to his friends as " my boy Jack " as Commander-in-Chief of the Grand Fleet at war.

Jellicoe qualified as a Lieutenant for gunnery in H.M.S. *Excellent* when that establishment was commanded by Captain John Fisher. Later, when Fisher became Director of Naval Ordnance, Jellicoe was his Assistant; and they worked together for many years upon the production of ships and the improvement of naval marksmanship, in which the late Admiral Sir Percy Scott was a leading spirit in the evolution of gun-laying and fire control.

In December, 1910, he was made Vice-Admiral commanding the Atlantic Fleet. At the Coronation Review of King George V, his flag flew in H.M.S. *Prince of Wales*.

Lord Fisher had formed the conclusion that war with Germany would come in about 1914, and as First Sea Lord he planned for the selection and training of a Commander-in-Chief. Upon his advice, in 1911, Jellicoe was made Second in Command of the Home Fleet. In December, 1912, he was appointed Second Sea Lord, when the Marquis of Milford Haven, then beloved of the Royal Navy as Prince Louis of Battenberg, was made First Sea Lord. During this time he went to sea during the grand manœuvres in 1913 in command of the Red Fleet, with his flag in H.M.S. *Thunderer*, while still retaining his seat as a member of the Board of Admiralty. On 31st July, 1914, it was intimated to Jellicoe that he might be appointed Commander-in-Chief, in succession to Admiral Callaghan. He protested against such a change on the very eve of war. Early on the morning of 4th August, he was appointed Commander-in-Chief of the Grand Fleet, with the acting rank of Admiral, his flagship H.M.S. *Iron Duke*.

His two books, " The Grand Fleet 1914–1916 " and the " Crisis of the Naval War," give his own account of the naval war, while he was Commander-in-Chief of the Grand Fleet and First Sea Lord of the Admiralty.

During 1919 he undertook a mission for the British Government to confer with the Dominions on the common defence of the Empire. From 1920 to 1924 he was a most successful Governor-General of New Zealand.

In 1928 he became President of the British Legion in succession to Lord Haig.

His friends speak of his absolute natural simplicity. He was beloved by his officers and men for his steady courage, imperturbable self-control, and quiet steadfast confidence. He endeared himself especially to us, the officers and men of the Royal Naval Reserve in the fleet sweepers, armed merchant cruisers, armed boarding steamers and the trawlers, by his appreciation of the particularly strenuous work which these craft were called upon to do; and his encouragement was the great incentive which sustained the whole service.

The German Navy, in flying their colours at half mast, indicated their appreciation of the man.

The Merchant Navy is joined with the Royal Navy in mourning the passing of this Great Seaman.

L. A. B. S.

28th November, 1935.

THE MARINE OBSERVER, 1936.

In this number, the thirteenth volume of The Marine Observer is commenced, and contrary to superstition, may it be a lucky one. We wish all our readers a very Happy New Year.

In this number "World-wide System of Voluntary Selected Ships Routine Wireless Weather Telegraphy" is republished, corrected to date, as is usual in the January number. The corps of voluntary marine observers is invited to refresh their knowledge of this subject; and in each of the numbers which follow, the lists of shore W.T. stations detailed to work with British Selected Ships will be kept up to date, amendments being made by the Supplements, when necessary.

In the April, July and October numbers of The Marine Observer will be given, in a form convenient to mariners, descriptions of wireless weather signals made from the shore intended to aid navigation, wireless time signals, and wireless ice signals, used in different parts of the world, arranged geographically as far as possible.

In this number, Mr. Barlow has summarized knowledge of rainbows and fog bows at sea, to which the British corps of voluntary marine observers has added in recent years.

By means of the better information derived from the greatly improved system of observation, which has been in use since British Selected Ships were organized in 1930, following the International Conference on Safety of Life at Sea in 1929, we have in this number attempted to make a comparison of the severity of the weather of the North Atlantic during the last five winters, in a way which we hope will be of some practical assistance to those who navigate and manage shipping.

In this year's numbers, some account of the weather in the North Atlantic, at the time of the loss of three British ships, concerning which Board of Trade enquiries were held, will be given by Commander J. Hennessy, R.N.R.

In this number, the first instalment of an abbreviated biography by Commander M. Cresswell, R.N.R., of the great navigator, James Cook, is published, and will be completed in the April number.

In the July number, "Dead Reckoning" will be written about by Commander C. H. Williams, R.N.R.

Following the completion of the new atlas of currents of the Indian Ocean which will be published shortly, the work of re-charting the currents of the South Pacific was started last April.

It has been necessary to somewhat re-arrange the programme and the sections for charting the currents of the South Pacific which was published in my notes in the April, 1935, number. This year the greater part of the South Pacific south of Latitude 34°S., so far as the observations available will allow, will be dealt with; and in the April and October numbers, the information derived from these Charts will be summarized.

In 1937 the portion of the South Pacific eastward of Longitude 124° W. will be completed; and in 1938 it is intended to chart the remainder of the South Pacific, that is northward of Latitude 34° S. and westward of Longitude 124° W., including the Coral Sea and Torres Strait, and the waters eastward of New Guinea, to the south of the Equator.

It is in this last portion and particularly off the more frequented trade routes, that we shall be most in need of observations other than those already returned to the Marine Division.

Commanders M. Cresswell and C. H. Williams, at Liverpool and London respectively, will have copied from the log books of British ships which navigated these regions since 1910, the set and drift of currents, if their Commanders or owners will kindly notify them that such observations are available.

It is intended to publish a new atlas of the Currents of the South Pacific with the information derived from these charts early in 1939.

Most important of all, in the Marine Observer's Log will be published original remarks and observations of experiences at sea.

British Selected Ships in the regularity and accuracy of their work are a most valuable guide to the merchant navy in wireless weather telegraphy and weather forecasting at sea. They are now the mainstay of this work in all parts of the oceans.

Last year we drew attention to the desirability of any British ship carrying on this service, when and where there are not sufficient Selected Ships. It was recently asked by a gentleman deeply interested in British shipping: How are the masters of British ships, which are not Selected Ships, to know when they should carry on the service? The answer is to be found in the Notes for the guidance of the Masters of British ships (not Selected Ships) on page 25 of the Third Edition of the Pamphlet, M.O. 329, which is published for general use throughout the merchant navy. This says—"It is desirable that the master or officer of the watch should be kept informed by the wireless operator of the weather reports made by ships in range, so that he may determine if it is necessary to make a report at the next schedule time for communication."

As the practice of drawing weather charts at sea, or of visualising from wireless reports the general distribution of wind and weather, becomes more general at sea, so will the desirability of those ships which are most suitably distributed for reporting become more generally apparent throughout the sea services. It is desirable as far as possible that this should be a matter of judgment by those at sea, rather than a matter of attempting hard and fast regulation from the shore, which is contrary to seamanlike instinct and might sometimes be unworkable through lack of information ashore.

The main object of the work of the corps of voluntary marine observers, up to the present, has been to provide information to aid navigation, at the same time furthering the service of meteorology in its work for the community at large, including aviation.

Article 35 was accordingly adopted by the Convention for Safety of Life at Sea, and is now part of the Merchant Shipping Act.

This service has been organized as far as possible to enable the officers of the merchant navy to use their initiative, for self-dependence is a necessity for the efficient conduct of work at sea.

Not only is it desirable that navigators should have the aid provided by this mutual assistance of reporting weather, currents, and ice, and that the meteorological centres ashore should have sufficient information of weather at sea, but the developments which are pending make it necessary for the meteorological services ashore to receive a greater volume of weather reports from ships at sea in the near future.

Last March, the Under Secretary of State for Air, the Rt. Hon. Sir Philip Sassoon, M.P., in presenting to the House of Commons the Air Estimates, indicated that plans had been formulated for the carriage of the bulk of first-class mail by air to different parts of the British Empire at the ordinary postage rates, and that subject to certain negotiations and the necessary financial arrangements, this would be brought about by 1937.

During the last few weeks a good deal has appeared in the daily press regarding the development of commercial overseas air services, and the use of flying boats.

It is evident that several of the officers' training establishments of the merchant navy are alive to the significance of these developments to the merchant navy, and in the October, 1935, number we were pleased to publish an account by Commander T. M. Goddard, R.N.R., of the steps being taken by the *Conway*.

It is likely that arrangements may be made at no great distant date for the reception at certain coast wireless stations of weather reports from more ships at sea; and commanders, officers and W.T. operators of British ships are asked during the coming year to watch carefully in each number of The Marine Observer, as it is published, the lists of stations detailed to receive weather reports from British Selected Ships in all parts of the world.

These lists are also given in Vol. II of the Admiralty List of Wireless Signals, and amended as necessary by Admiralty Notice to Mariners, so that the Masters of all British ships may have the necessary information for reporting to the shore when and where desirable.

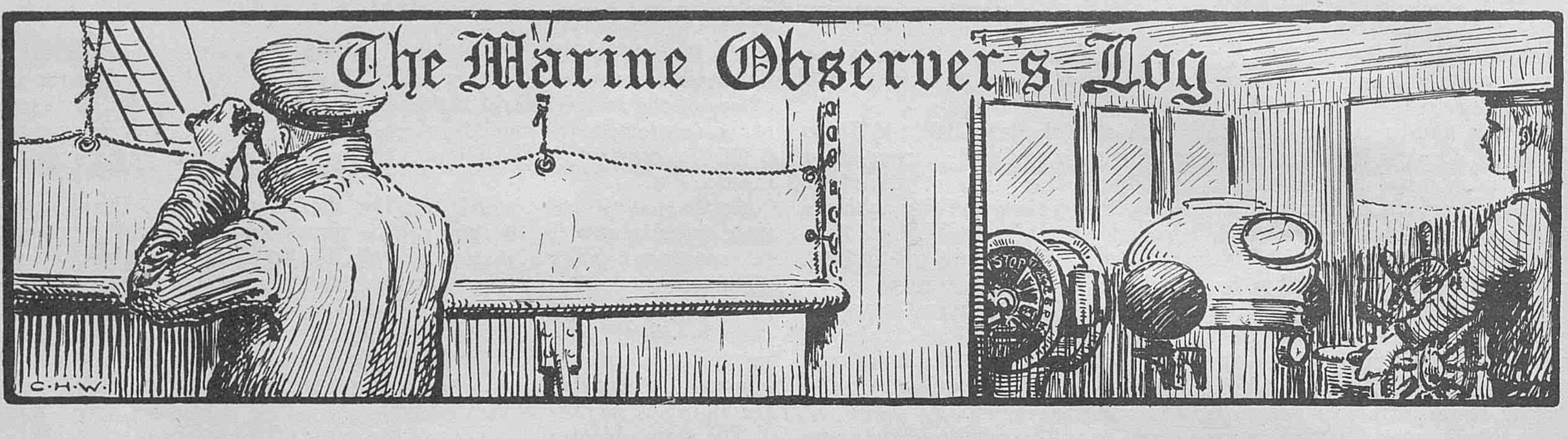
The commanders, officers and W.T. operators of British Selected Ships have proved the system to be efficient for navigation, and for aiding weather forecasting at meteorological centres ashore. By extending this service, the needs of the commercial service of the air can be met better and with less inconvenience to the Merchant Navy than if other methods are adopted.

It will be in the interests of the whole British Merchant Navy if marine observers will assist us by advising their opposite members in British ships which are not regular observers, and so not in the fleet list in The Marine Observer, of the desirability of falling into line with the procedure.

The great majority of British shipowners have placed the pamphlet M.O. 329 on board their ships, for the use of the master and his officers, so indicating their support of this system; and Shipowners' Associations have taken considerable trouble in making known its advantages to navigation.

Marine Superintendent.

London, 17th October, 1935.



January, February and March.

It is hoped that these pages will be filled each quarter with a selection of the contributions of Mariners in manuscript, or remarks from the Logs and Records of regular Marine Observers.
Responsibility for statements rests with the Contributor.

NOTES ON NAVIGATION OF JOMARD ENTRANCE (Louisiade Archipelago) and Adjacent Islands.

The following is an extract from the Meteorological Log of S.S. *Deebank*. Commander J. K. Brook, D.S.O., R.D., R.N.R., Newcastle, N.S.W., to Shanghai. Observer, Mr. F. C. Cormack, 2nd Officer.

24th March, 1935, this vessel passed through Jomard Entrance and through the islands, passing westward of the Bondouloir Group and to the eastward of the Trobriands.

On entering, a strong tide rip was passed through, stretching straight across the opening, but of no great breadth. Immediately after, this vessel's speed increased to 13 knots,* but only until clear of the entrance. At 8.49 a.m. the northern extreme of Jomard Island was abeam bearing 256° and distant 1½ miles. Course was then set (the passage through Entrance having been made to Master's orders) to 346°, and this course was held until Lunn Island was abeam, bearing 256° distant 2 miles.

From this it would appear either that the Conflict Group is correctly charted, in so far as that it is not 2¾ miles to the south-eastward, or else that the entrance is also to the eastward of its charted position. (This seems unlikely as no difficulty has been experienced when making the Entrance.) What does seem more probable, however, is that the islands of Bunora and Sarupai are charted too far to the north-eastward, as, after bringing Lunn Island abeam, course was altered to 334½° which, if reference is made to chart 2123, would show the vessel passing straight over the centre of Bunora, whereas it was abeam to port bearing 244½° and at an estimated distance of 2 miles at 1.15 p.m.

With regard to Hastings Island, East Island and the Strathord Islands, whilst the *Latitudes* of the *southern* ends of these islands would appear to be correct, or at all events nearly so, bearings taken with these islands are entirely useless, as the northern extremities will not fit in, in any way whatsoever.

A fairly reliable fix can, however, be obtained by using Cape Ventenat and Dawson Island.

At 2.53 p.m. the southern extreme of Strathord Island was abeam 076°, approximately 3½ miles. Course was then set 346°, which course was held until 00.20 a.m. of the 25th, when the northern extremity of Kitava Island was abeam 256°. Course was then altered to 323°, which passed Cape Dennis at 02.25, 6 miles, bearing 233°, tide or current having been adverse during this period and running approximately 1 to 1½ knots. A definite direction for the set could not be ascertained from a really good position, owing to it being moonlight. It may, however, be taken as being almost as directly adverse (143°).

On Tuesday, 26th, at 00.00 hours, vessel entered Vitiaz Strait. An unusual feature in this passage of the Strait was the total lack of any current whatsoever. No favourable current being evident course was altered to pass between Rooke Island and Long Island.

This is the first time in the master's and writer's experience when there has been no current in this locality. Another point of note is the fact that the abnormal magnetic variation noted on the chart 2766 has not been experienced at any time in this neighbourhood by vessels on which the writer has served.

The above passage through Jomard Entrance and Vitiaz Strait has been made six times by Commander Brook and the writer. Five times on M/V *Springbank* when the writer was serving as 3rd Officer under Commander Brook, and once on this vessel. The notes given about Jomard refer to the manner in which these vessels have been navigated on these occasions.

DISCOLOURED WATER.

South Pacific Ocean.

The following is an extract from the Meteorological Log of M.V. *Aorangi*. Captain J. F. Spring-Brown. Auckland to Suva. Observer, Mr. L. P. Bourke, 3rd Officer.

7th February, 1935, during the afternoon watch, the vessel passed through numerous patches of what appeared to be thick brown scum. Several attempts were made to take a sample of water by means of canvas bucket used for sea temperatures. Two casts were particularly fruitful, for when the water was poured into tumblers, several tiny bodies were found in each. They varied from a tenth to a thirty-second of an inch in length, were brown, and appeared to be covered in thick short hair. In general appearance they suggested tiny caterpillars. One (the largest) alternately curved and straightened its body and propelled itself very slowly in a definite direction. None of the others seemed to move its body, but yet slowly shifted about up or down or laterally. While examining these creatures, other very minute creatures were observed with the aid of an ordinary chart magnifying glass. Two in one glass were particularly interesting. They were of the thickness of a hair and about one thirty-second of an inch in length. They propelled themselves by spasmodic jerks in exactly the same fashion as shrimps. Of course, the distance moved each kick was very small but quite in proportion to their size when compared with a shrimp. Whether they went ahead or astern we were unable to tell, because no head or tail was discernible.

Weather calm, 1/4 clouded. Sea temperature 80°. Current morning to evening twilight 025° 0·16 miles.

Position of ship, Latitude 23° S., Longitude 177° E.

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* According to Meteorological Log ship was averaging through the water 10·5 knots before entering and 10·7 after leaving this strait.

CLEAR SEA.

West Indies.

The following is an extract from the Meteorological Record of S.S. *Inanda*. Captain W. Gibbings. Antigua to London. Observer, Mr. T. E. Steel, 2nd Officer.

February 2nd, 1935, 1335–1350 A.T.S. from Latitude 17° $14\frac{1}{2}'$ N., Longitude 61° 47′ W. to Latitude 17° $15\frac{3}{4}'$ N., Longitude 61° $44\frac{3}{4}'$ W. the sea was remarkably clear—sandy bottom, coral and rock being distinctly seen at depths varying from 9 to 18 fathoms (from chart). The colour of the sea was a very light green and had the appearance of shoal water.

Brilliant sunshine—cloud Fr.-Cu. 3/10. Temperature air 82°, sea 79°.

At 1350 the sea assumed its normal blue colour.

CURRENT RIP.

South Indian Ocean.

The following is an extract from the Meteorological Log of S.S. *Cornwall*. Captain A. E. Lettington, D.F.C. Fremantle to Aden. Observer, Mr. A. Brown.

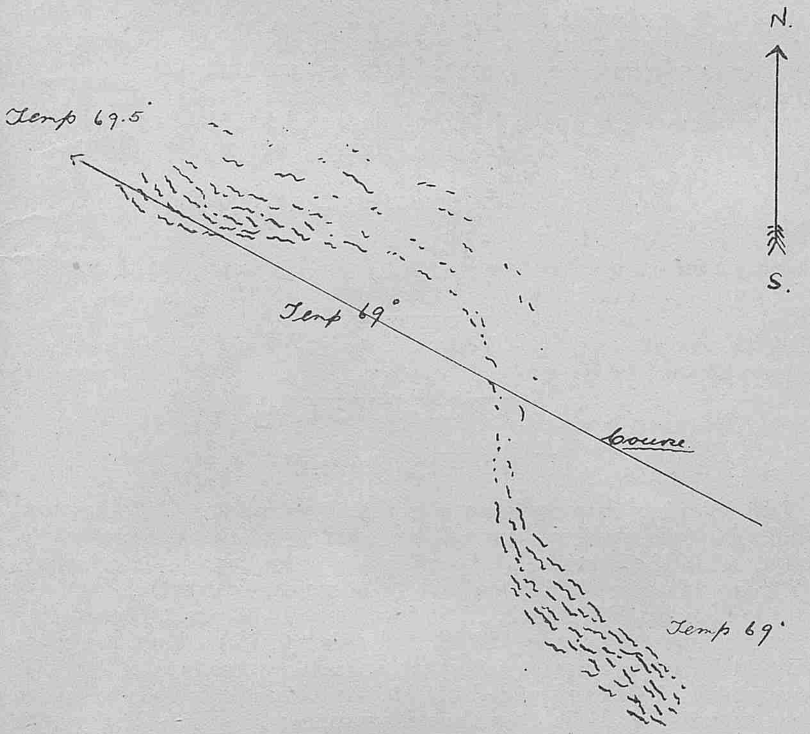


Diagram of Current Rip.

May 26th, 1935, at 1110 A.T.S. observed long line of breakers running in N.N.W. and S.S.E. direction. As vessel entered this line a very turbulent sea, toppling and running as though over a bank, and noise due to increased wave motion against ship's side were most apparent. After running about one mile vessel again entered line of breakers, the line of demarcation between comparatively smooth and rough water occurring in about 250 ft. The sea to eastward of the line of breakers was breaking to a far greater extent than that to the westward. Observed length of breakers about 5 miles, when sea gradually became normal again.

The accompanying diagram gives sea water temperature. Wind at time S.S.W., force 5.

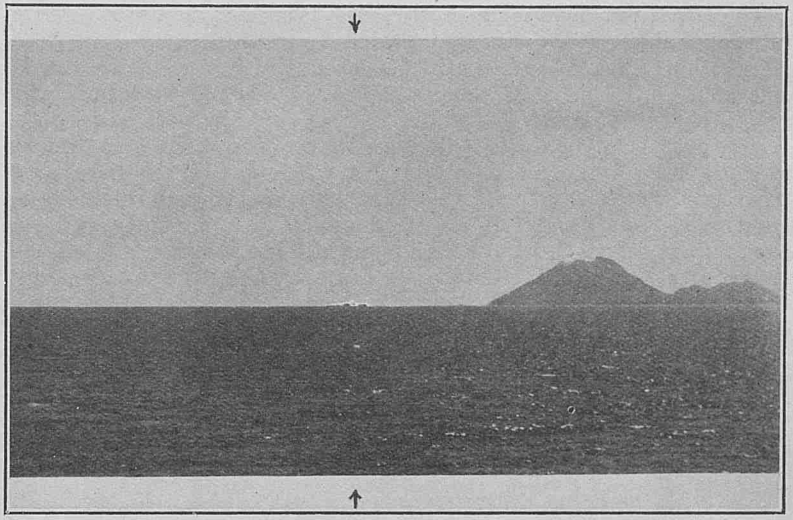
Position of ship, Latitude 27° 34′ S., Longitude 106° 01′ E.

VOLCANIC ISLAND.

Van Diemen Straits.

The following is an extract from the Meteorological Log of S.S. *Empress of Japan*. Captain L. D. Douglas, R.D., R.N.R. Shanghai to Kobe. Observer, Mr. G. W. R. Graves.

This volcanic disturbance was first noted on November 20th, 1934, when in latitude 30° 58′ N., longitude 130° 20′ E., large columns of smoke and vapour rising from the sea in approx. latitude 30° 48′ N., longitude 130° 20′ E., extending S.S.E. about 3 miles from Iwo Sima were observed.



The accompanying photograph was taken on March 26th, 1935, with Iwo Sima bearing 180° distant 7 miles. The activity continues and is observed on every occasion of passing through the Straits. The arrows indicate a small island which has come into existence since the beginning of this year. It can be seen that it is smoking.

Note.—*See also* report of S.S. *Alipore*. Captain E. F. Hannan, R.D., R.N.R., page 144, volume XII, Oct., 1935, number 120.

PAIR OF WHALES STRUCK BY SHIP.

Indian Ocean.

The following is an extract from the Meteorological Record of S.S. *Discoverer*. Captain W. Rowberry. Mombasa to Port Sudan. Observer, Mr. W. G. Imrie.

January 9th, 1935, at 12.45 p.m. A.T.S. in Latitude 0° 31′ N., Longitude 45° 05′ E., observed two whales which appeared suddenly very close ahead of ship. A few seconds later ship struck both whales with starboard bow. One whale was thrown violently aside by the impact struggling wildly and emitting quantities of blood from its head; the other appeared as if trying to pass under the ship's bottom, but not succeeding in doing so, remained with its head down and tail in the air beating the water and ship's side, probably foul of the bilge keel. Both whales were apparently stunned and wounded, if not actually killed, but quickly passed astern out of sight discolouring the water with their blood.

The whales seemed altogether oblivious of the approach of the ship.

No one on board remembers feeling any shock to the ship and it was therefore probably a glancing blow. The engineer on watch reported that he had had no indications of the propellor having struck anything.

Vessel steaming at 11 knots. Draft forward 18 ft. 3 in., aft. 20 ft. 0 in.

Moderate head wind and sea, with low short head swell.

ENCOUNTER OF A SHARK WITH A GIANT SQUID.

North Pacific Ocean.

The following is an extract from the Meteorological Log of M.V. *Aorangi*. Captain J. F. Spring-Brown. Suva to Honolulu. Observer, Mr. J. W. Madden, 3rd Officer.

12th February, 1935, 11.10 a.m. at ship, observed a large shark, approximately 15 feet long, close to surface on starboard side and about 50 feet from ship. At the same time a rusty brown shape, nearly circular, with a diameter of about 15 feet, was observed at the same distance from vessel but about 70 feet further aft and just below the surface.

The shark was swimming slowly away from ship, but when abeam of the Bridge, turned aft and darted beneath the other creature. Almost immediately dark red blood gushed to the surface on the far side of the attacked. Although the shark could not be seen for the blood, his wake, which lay at right angles to our own course, was clearly marked by red blood rushing to the surface in a continuous stream for a distance of about 300 feet. At one point in the retreat, what appeared to be a quantity of torn white flesh came to the surface. On looking back at the object, a triangular fin apparently a second shark, was observed to be circling about it. What this creature was I cannot say, but it was definitely not a whale. However, it tallied very closely to what I believe to be a giant squid.

Weather, Wind E. force 4, weather bc.p. Sea temperature 80°.

Position of ship, Latitude 8° 18′ N., Longitude 165° 22′ W.

MISTRAL.

Gulf of Lyons.

The following is an extract from the Meteorological Record of S.S. *Aeneas*. Captain J. Hatfield. Birkenhead to Marseilles. Observer, Mr. G. Drake.

January 4th to 5th, 1935. A mistral of peculiar violence was experienced on the night of January 4th to 5th. The barometer at noon of the 4th was 1021·4 mb., falling slowly, the weather clear and fine and the wind and sea light, from N.W. by N. A short low swell had been apparent from the N.N.W. since sunrise.

During the afternoon watch the barometer fell 7 mb. without any change in the weather. A further fall of 4 mb. was noted in the dog-watches, and at about 7.30 p.m. the wind began to freshen from N.N.W. At eight bells it was blowing a fresh breeze with an increasing sea and a short steep swell from the same point. By 9 p.m., with the barometer at 1008·0 mb., the wind had reached force 8, and the sea was becoming so heavy that the ship, though at an engine speed of 12 kts. was only making seven. The glass reached its lowest, between 9 p.m. and 10 p.m., 1007·6 mb. The wind at 10 p.m. was blowing whole gale force, hardening in squalls to storm force from N.W. by N. The crests of the short high seas came aboard continually and were picked up by the wind, making a smother to leeward that the eye could not penetrate. It was impossible to remain outside the wheel shelter on the bridge, the force of the wind bringing one up against the rail, all standing.

Towards midnight the wind eased to force 9 with squalls of whole gale force, and steadied at N.W. by N. until it blew itself out in the forenoon watch of the 5th. The barometer rose to 1010 mb. between midnight and 0600, where it steadied.

It appears that the wind made itself felt in Marseilles harbour, where a C.G.T. vessel laid up, broke adrift in the night, and being without steam, was brought up to two anchors in the first pass, effectually blocking the harbour entrance, and preventing a number of ships, including ourselves, from entering on January 5th.

SQUALLS.

South African Waters.

The following is an extract from the Meteorological Record of S.S. *City of Dieppe*. Captain H. Cartwright. Liverpool to Australia *via* Cape of Good Hope. Observer, Mr. W. G. Baillie.

February 3rd, 1935, 3.20 p.m. A.T.S.

Weather at time : Fine and rather hazy. Sky cloudless. Wind S.E. by S., force 4 to 5. Barometer reading, 1011·5 mb.

Experienced a succession of fierce wind squalls of hurricane force from the S.E., producing patches of seething or boiling waters with spray rising several feet high. Each squall was followed by a dead calm and patch of smooth water. The air temperature rose from 66° F. to 76° F. Sea temperature rose from 59° F. to 64° F. Barometer remained unchanged. These squalls, four in number and lasting three minutes each with a three minutes interval of calm between each squall, covered a period of approximately 21 minutes. Wind immediately afterwards came away strong from the S.E., force 6.

Position of ship, in Latitude 34° 18′ S., Longitude 17° 56′ E., 26 miles west of Cape of Good Hope.

HEAVY RAIN SQUALL.

South Indian Ocean.

The following is an extract from the Meteorological Record of S.S. *Arandora Star*. Captain E. W. Moulton. Mauritius to Bali Island. Observer, Mr. C. H. Hill-Willis.

March 6th, 1935, 0330 A.T.S. Latitude 11° 11′ S., Longitude 104° 50′ E., course 077°, 15 knots. Barometer 29·759 in. (corrected) wind N.W.'ly, force 3, temperature 82° F., the wind fell away to calm and variable airs for about 12 minutes. It then suddenly blew with moderate gale force for about 2 minutes and was immediately followed by torrential rain. The barometer remained steady, but the air temperature fell 8° to 74° F. The rain lasted for 3½ hours with only two short lulls, and then cleared. Temperature rose to 81° F., and wind settled W.N.W., force 3.

None of the ship's officers remembered experiencing rain of such violence before.

WILLY-WILLY.

North-West Australia.

The following extracts from a report by Captain J. Eggleston, S.S. *Koolinda*, received through the courtesy of the Manager of the State Shipping Service, has been forwarded by Captain J. J. Airey, Deputy Director Navigation and Lighthouses, Fremantle.

On Monday 25th March, I left Broome at 12.32 p.m. The weather at this time being strong E.S.E. and although I could not credit we would have any more cyclonic disturbances, there was a doubt in my mind. I had to proceed outside the Lacepede Islands to enable me to arrive at Meda Pass the next morning to go into Derby with the tide. Up to this period I had had very good weather and had made up one day on our schedule. The weather report which I received, at 4.30 p.m. the same day 25th March, forecasted " Squally E. to N.E. winds off the N.W. coast."

I proceeded at reduced speed and at 5 p.m. the weather moderated with a barometrical change—rising. On altering course at 9.40 p.m. to E.N.E. the wind again freshened with the barometer falling slightly. At midnight we had occasional fierce squalls of light rain but no noticeable barometrical fall. Nevertheless I had my suspicions and had number two hatch (where the Wyndham meatworkers and Derby shearers were sleeping) closed and battened down, leaving one section open. At 3.42 a.m. I raised Cape Leveque Light, being well within the range. I made sure of my position but at 4 a.m. on 26th March owing to fierce wind and rain squalls I had to turn about, the light being obliterated. At 5.06 a.m. when returning I had the light bearing S. 50° E. True, distant six and a half miles, but the rain again prevented me from going any further and I had to turn about at 6.03 a.m. I was very anxious to get into King Sound and anchor at Point Torment although Derby would have been impossible with the weather we were experiencing at the time.

At 7 a.m. I turned all hands to lowering gear, securing hatches, lashing boats, and making all secure throughout the vessel. At 8 a.m. the log's reading was E.S.E. 8, fresh gale, rough choppy steep sea, squally with continuous rain. I again returned and had a glimpse of Leveque Island and was thus re-assured of my position. I had to turn about again and was firmly convinced that this was more than rough weather. I sent an official message to Weather Perth at 10.28 a.m. for the state of weather at Broome, Derby and Wyndham receiving a reply addressed to *Koolinda* Broome Radio at 10.59 a.m. with the various readings of rain and forecast. The forecast was "Squally S.E. to E. winds with rough weather off N.W. coast." I still could not believe this so manœuvred into a position to be able to run to clear my vessel from all dangers and at 1 p.m. decided in my opinion it was necessary to cross ahead of the centre of the cyclone. I accordingly altered course to N. 44° W. True and decided that we would go a little more than normal full speed.

At 1.50 p.m. I again sent an official message to Weather Perth, giving them the state of the weather. By this time I definitely knew that a cyclone of fierce intensity was approaching the vessel but I had no doubts that I would clear it. At 5 p.m. the vessel running with the wind doing an estimated speed of 20 knots, experiencing a whole gale, wind at hurricane force, continuous rain, high mountainous sea and shipping water over all, passed ahead of the centre of the storm.

During this period I had the Chief Engineer and all his staff standing by in the engine-room as I had the greatest difficulty in keeping the vessel from running back into the wind.

A gentleman aboard this vessel who was an experienced meteorological observer and had been used to observing cyclonic weather informed me afterwards that he thought the wind force was anything from 85 to 95 miles per hour. Of course the vessel in addition was running away from the wind at at least 20 knots. The intensity of the storm must have been terrific as we passed ahead of the centre.

At 7 p.m. the engines were reduced to 105 revolutions and I altered course more to the westward. The weather was improving all the time. On Wednesday 27th March at 6.50 a.m., after obtaining my position, I proceeded slowly back steering S. 70° E. True but at 11.34 a.m. with the barometer again starting to fall I turned around and carried on on the reverse course until 5.02 p.m. with the barometer remaining stationary. At 10.25 p.m. I altered course to be in a favourable position to proceed to either Derby or Wyndham and increased to full speed. The barometer continued to remain steady and I knew we were clear.

The sea bottom was very much churned up, square yards of seaweed floating all around us and at 8.15 a.m. whilst I was standing in the starboard wing of the bridge I observed a suspicious-looking object passing on the starboard beam. On observation this proved to be a dismasted lugger flying a distress signal. I manœuvred the vessel around and at 8.25 a.m. sent away one of the starboard lifeboats under the Chief Officer, Mr. Sinclair, with a picked boat's crew. The weather was still bad with a rough sea and heavy swell and I manœuvred the vessel into position, pumped oil over the side to enable the lifeboat to come alongside the lugger. The seamanship shown by the Chief Officer and his picked crew was deserving of the greatest commendation.

The lifeboat returned with ten men from the lugger which was number *B* 95. After information received from the number one man of these men I decided to try to search, without any danger to this vessel, for any possible survivors. We passed wreckage all the way and at 1.40 p.m. sighted another lugger flying distress signals and again the Chief Officer and his crew brought the distressed men back without mishap.

At 6.08 p.m. I decided to make sure of my position and proceed towards Cape Leveque. At 9.01 p.m. I anchored off Cape Leveque, distant about 14 miles.

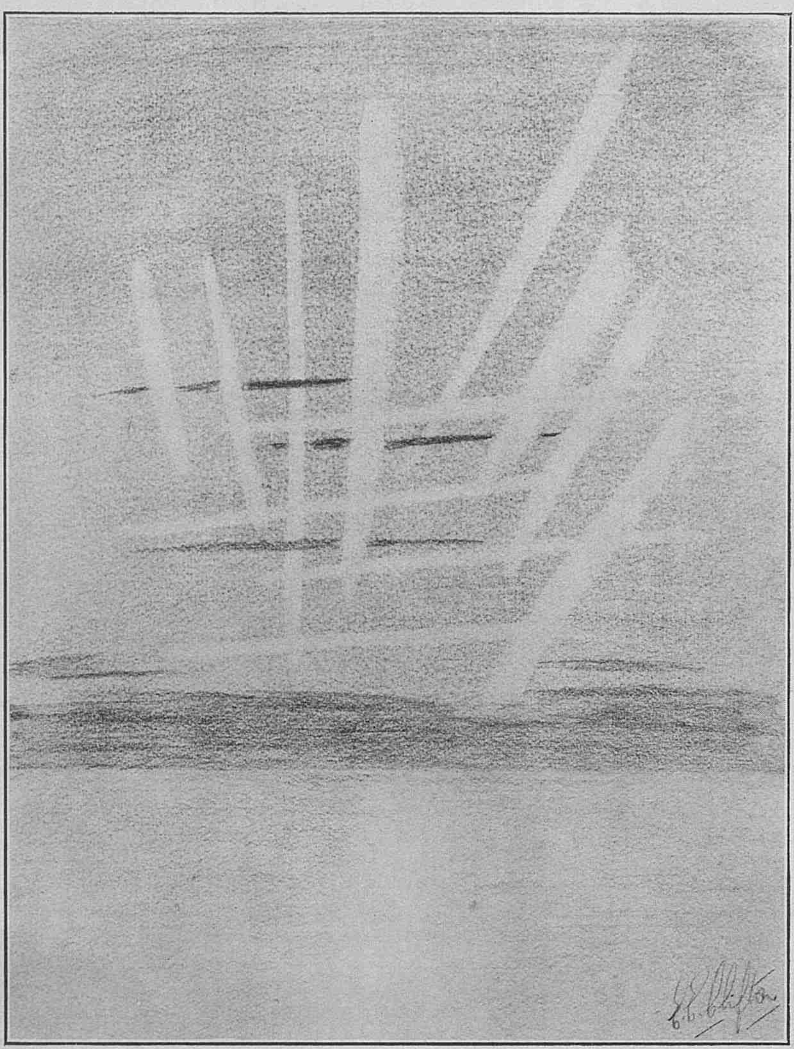
Extract from Deck Log of M.V. "Koolinda," showing Records made during Willy-Willy or Cyclone experienced on N.W. Coast of King's Sound on March 26th/27th, 1935.

Date	Time	Bar.	Therm.	Wind	Force	Visibility	Remarks
1935	a.m.	in.					
Mar. 26	3·42	29·70	82°	E.S.E.	6	5	C. Leveque Light 87° distant 14½ miles approx.
,,	4·00	29·67	81°	E.S.E.	6	5	Rough sea, mod. swell, overcast.
,,	5·00	29·67	81°	E.S.E.	7	5	5·06 C. Leveque light bearing S.50°E 6½ miles.
,,	6·00	29·68	81°	E.S.E.	7	4	6·03. Turned about Course N.68°W.
,,	7·00	29·62	81°	E.S.E.	7	4	
,,	8·00	29·68	80°	E.S.E.	8	4	Squally with continuous rain.
,,	9·50	29·69	83°	E.S.E.	8	4	8.40 a.m. C. Leveque Is. 44° distant 3½ miles.
,,	10·28	29·64	80°	E.S.E.	8	4	9.50 a.m. a/c N. 25°E.
,,	11·00	29·65	80°	E.S.E.	8	4	
,,	Noon	29·65	80°	E.S.E.	8	4	Fresh Gale, Rough Sea.
	p.m.						
,,	1·00	29·42	80°	E.S.E.	8	4	a/c N. 46° W. Comp. = 316°.
,,	2·00	29·56	80°	E.S.E.	8	4	
,,	3·00	29·53	80°	E.S.E.	8	4	3.20 p.m. Heavy wind and rain squalls. Wind shifted to south.
,,	4·00	{ 29·44 c.29·19	80°	South'ly	11	4	Whole gale. Wind of hurricane force almost continuous.
,,	5·00	29·50	78°	S.S.W.	11	4	Wind and rain squalls. High to mountainous sea.
,,	6·00	29·56	78°	S.S.W.	11	4	5 p.m. a/c to 287°.
,,	7·00	29·43	78°	S.S.W.	11	4	7 p.m. Cor. Bar. 29·47. Engines reduced to 105 revs.
,,	8·00	29·70	79°	S.S.W.	11	4	High confused sea and swell.
,,	9·00	29·75	79°	S.S.W.	10		
,,	10·00	29·80	79°	S.S.W.	10	4·5	
,,	11·00	29·80	79°	S.W.	9–10	4·5	10.30 slight improvement in weather conditions.
,,	Midnt.	29·80	80°	S.W.	8–9		Mod. Gale and sea.
	a.m.						
Mar. 27	1·00	29·81	80°	S.W.	9		
,,	2·00	29·81	80°				
,,	3·00	29·83	82°	W.S.W.	8		Weather moderating.
,,	4·00	29·86	82°	W.S.W.	6	7	Moderate gale, heavy confused sea.
,,	5·00			S.W.	5		5.50 a.m. Obs. position. Lat. 15° 01′ S. Long. 119° 20′ E. a/c S. 70° E.
,,	7·00	29·87	84°				
,,	8·00	29·87	82°			7	
,,	Noon	29·85	85°	S.W.	4	7	Noon. Position obs. Lat. 15° 10′S. Long. 119° 45′E. High sea and swell. clear and cloudy and fine.

AURORA AUSTRALIS.

Southern Ocean.

The following is an extract from the Meteorological Log of R.R.S. *William Scoresby*, Captain C. R. Boothby, R.N.R. cruising in Antarctic whaling grounds, observer, Mr. E. E. Clifton.



14th March, 1935, 2400 in latitude 67° 20′ S., longitude 14° 29′ E. Aurora Australis was observed to the southward.

Beginning at 2300, its altitude reaching only 25½°, it gradually increased in intensity and altitude until it finally reached the zenith and attained its greatest intensity at 0100, 15th March. The whole was then observed to quickly disappear.

Whilst the vertical shafts of light—emerald green—were seen to remain steady, the horizontal ones were continually surging up and down through about 5°.

Cloud : Stratus low on horizon.

ABNORMAL REFRACTION.

North Atlantic.

The following is an extract from the Meteorological Log of S.S. *Hertford*. Captain J. Burton-Davies. London to Curaçao. Observer, Mr. M. Willmott.

27th January, 1935, 1741 A.T.S., observed abnormal refraction; the sun's lower limb was practically touching the horizon when it appeared to rise about one degree. The following observations were made. Dry bulb 77·2°, wet 68·0°, sea 81°. Bar. 1014·4 mb. The sun's upper limb dipped below the horizon at 1748 A.T.S. The calculated time of sunset was 1743 A.T.S.

Position of ship, Latitude 15° 24′ N., Longitude 62° 26′ W.

LUNAR RAINBOW.

North Atlantic.

The following is an extract from the Meteorological Record of S.S. *Inanda*. Captain W. Gibbings. London to Antigua, W.I. Observer, Mr. W. S. Eustance, 3rd Officer.

January 22nd, 1935, 21·15 A.T.S., during the approach of a heavy nimbus cloud and accompanying shower, observed a very distinct and complete lunar rainbow whose altitude was 26° 30′. At the onset the colouring of the bow was a faint green and the width was 2°, but on the near approach of the shower the width increased to 5° and the colours now visible were red on top then orange, yellow and green, the latter being the widest band.

At 2125 the cloud thinned and stars of the 2nd magnitude could be observed through the background of the bow, which was still as distinct as before.

At 2130. Shower passed ahead of ship and bow quickly disappeared, assuming the appearance of a thin white band before doing so.

Altitude of moon 15°. Bearing 088°.

Position of ship, Latitude 21° 23′ N., Longitude 55° 21′ W. Course 233°. Speed 13 knots.

LUNAR HALOS.

North Pacific Ocean.

The following is an extract from the Meteorological Log of S.S. *Deebank*. Captain J. K. Brook, D.S.O., R.D., R.N.R. Müke to Nauru. Observer, Mr. F. C. Cormack.

26th January, 1935, 2.40 a.m., a very good example of a lunar halo was observed. It was complete and was of 23° radius. The colours visible were red, yellow, green and blue in that order from the inner band, and all were exceptionally bright and well-defined. This halo continued throughout the watch, and at 3.45 a.m. a portion of another halo, concentric with the first, was observed. The portion of the second halo was of approximately 45° radius, but was faint and no colours could be distinguished, it merely appearing as a white luminous bow.

Position of ship, Latitude 11° 10′ N., Longitude 154° 12′ E.

UNUSUAL LUNAR HALO.

North Atlantic Ocean.

The following is an extract from the Meteorological Record of M.V. *Accra*. Captain J. C. Shooter. Liverpool to West Coast of Africa. Observer, Mr. J. E. Dutton.

March 13th, 1935, 2230 G.M.T. Remarkable lunar halo. When first observed showed as a plain white ring with a radius of 15°, which slowly expanded to a maximum radius of 24° at 2245 G.M.T. From then the width of the halo increased, but gradually changed colour from white to grey, finally disappearing at 2300 G.M.T.

Position of ship, Latitude 20° 10′ N., Longitude 17° 45′ W.

GREEN RAY AT SETTING OF VENUS.

North Indian Ocean.

The following is an extract from the Meteorological Record of S.S. *Alipore*. Commander J. K. Chaplin, R.D., R.N.R. Singapore to Bombay. Observer, Mr. G. C. Copeland.

26th March, 1935, at 1402 G.M.T. Venus set. Weather calm with exceptionally clear atmosphere with a small pack of tropical cumulus about 3° above western horizon. Watching with a pair of prismatic binoculars as Venus dropped below these to the horizon, it appeared very much magnified by refraction and was flickering from orange to deep red. As it set a remarkably distinct " Green Flash " appeared.

Position of ship, Latitude 5° 55′ N., Longitude 90° 57′ E.

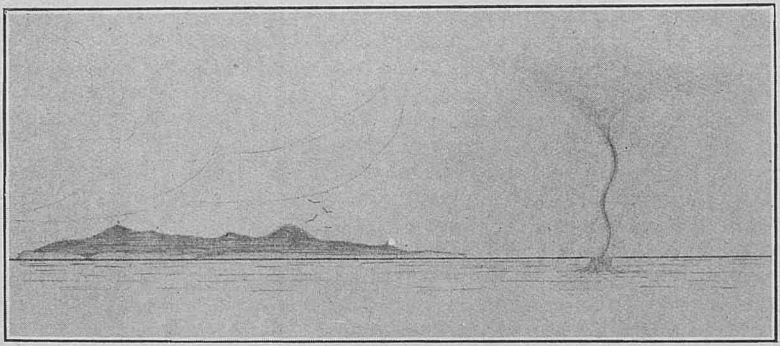
NOTE.—Previous observations of the green ray at the setting of Venus will be found in Volume VII, 1930, page 8, and Volume VIII, 1931, page 209. Though most frequently observed in connection with the sun, this phenomenon is occasionally observed with other bodies.

WATERSPOUTS.

Tyrrhenian Sea.

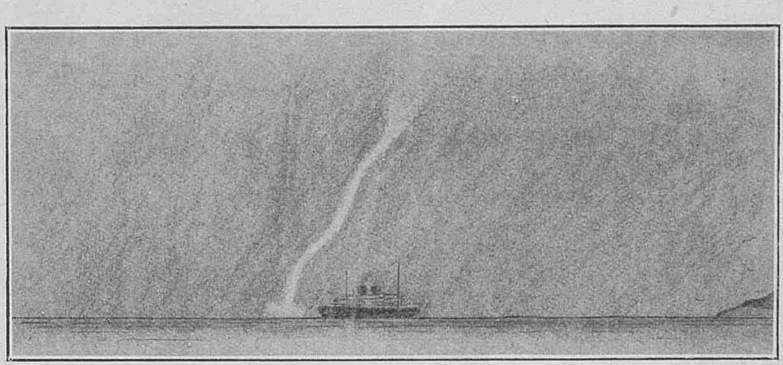
THE following is an extract from the Meteorological Record of S.S. *Aeneas*. Captain J. HATFIELD. Marseilles to Port Said. Observer, Mr. G. DRAKE.

January 6th, 1935. The accompanying sketches are of two of the several very fine examples of waterspouts, observed between 0800 and 1000. Altogether five waterspouts completely formed during this period, and several made abortive attempts to form. SKETCH 1 is of the first observed. Its peculiarity was a thin dense core around which a tenuous vapour column whirled visibly in an upward spiral, occasioning several comparisons to a barber's revolving pole or to a stick of barley sugar, among the passengers. The whole " life " of the subject of the second sketch was seen, from the first slight disturbance of the sea surface through all the stages of growth and decay to its final dissipation. The steamer, a Messagerie Maritimes vessel, had to alter her course appreciably to avoid a collision.



Sketch 1

09.15 ATS. Waterspout off Capraia.



Sketch 2

09.50 ATS. Waterspout off Elba.

METEORS.

Red Sea.

THE following is an extract from the Meteorological Record of S.S. *Malda*. Captain F. CAFFYN. Port Sudan to Aden. Observer, Mr. J. F. TWITE.

5th January, 1935, 0100 Ship's Time, a meteor was observed bearing 050°, whose brilliancy was approximately equal to the moon at full.

It appeared about 3° above α Canum Venaticorum (Cor Caroli), pale green, and fell slowly towards the horizon in a straight line to about 3° below this star. It maintained its brilliancy for a period of 8 to 10 seconds and left behind a straight luminous trail. In mid-flight its colour changed to red and green, but on disappearing had resumed its pale-green colour.

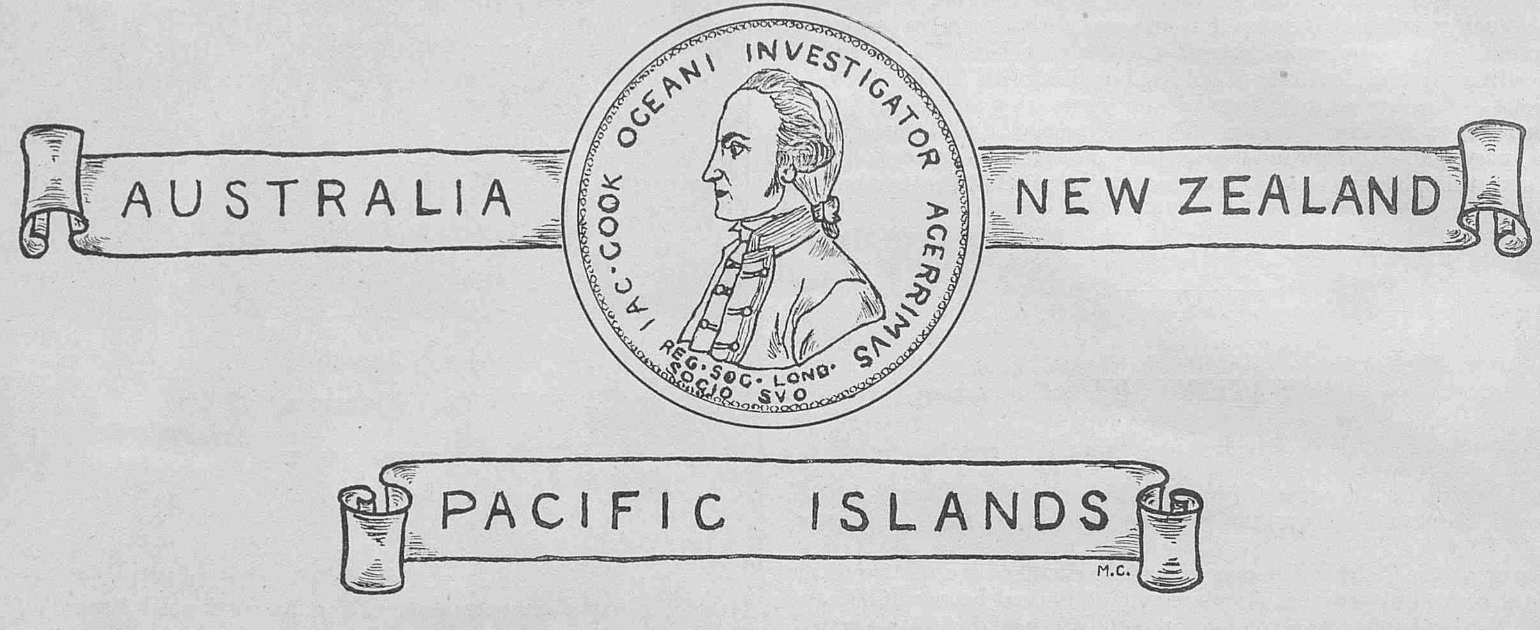
The luminous trail remained visible for 3 minutes, during which time it assumed the form of a W on end, *i.e.*, ⩾. This closed gradually into a horizontal form and as such disappeared. The night was clear and cloudless.

Position of ship, Latitude 14° 20′ N., Longitude 42° 34′ E.

North Indian Ocean.

THE following is an extract from the Meteorological Record of S.S. *Contractor*. Captain D. L. WHYTE. Suez to Calcutta. Observer, Mr. A. L. COTTIER.

March 10th, 1935, 2233 A.T.S., in Latitude 9° 06′ N., Longitude 64° 56′ E., a brilliant bluish-green meteor was observed falling from an approximate altitude of 25°. It fell about four degrees in two seconds and then burst into several red stars which fell a short distance before fading out. Bearing throughout fall 073°, *i.e.*, immediately under Arcturus. Weather, part cloudy (Cu. 2), light E.N.E. wind. Visibility excellent.



CAPTAIN JAMES COOK.

1728–1779.

Prepared by Commander M. Cresswell, R.N.R.

James Cook was born on the 27th October, 1728, in the little village of Marton, in that part of Yorkshire known as Cleveland. His father was then a farm labourer and lived in one of the mud huts common in that neighbourhood. Up to the age of thirteen James, who was one of a family of nine children, was employed about the farm. Mary Walker, the wife of a wealthy yeoman of Marton, seems to have taken the trouble to teach the child to read, but later he was sent to school at Great Ayrton, where he learnt writing and arithmetic, and we are told displayed "a very early genius for figures."

In January, 1745, young James was apprenticed to a Mr. Sanderson, who kept a combined grocery and drapery shop in the fishing village of Staithes. We can visualize Mr. Sanderson's apprentice employed upon his duties, rising early from his bed under the counter, sweeping and cleaning, laying out the goods—his breakfast probably a hunch of bread, a lump of fat bacon and a mug of ale. This despatched, all day long he would fetch, carry, wait, serve and listen to the instructions of Mr. Sanderson. He would also listen whenever he could to the talk of the sea-faring men on the Staithe (wharf), and hear many things both strange and wonderful. To many British boys, when they hear stories of the sea, there comes to them a longing so mighty that it overpowers them, and a call not to be resisted causes them to betake themselves to some place where they, too, can become sailors, for good or for evil.

At the time of which we are writing it would be mostly for evil, for in those days a seaman had conditions to contend with the like of which are now entirely forgotten; there was scurvy, clumsy ships, worm-eaten bottoms, foul water, rotten salt junk, weevily biscuits, often rations were short; there were Captains who could, and sometimes did, have the flesh lashed off a seamen's back; there was the enemy afloat and there were sharks ashore—yet James Cook, fortunately for his Country, answered the call of the sea, and one night when all was quiet, ran away to the port of Whitby, some ten miles distant, arriving there in the early morning to find work in full swing about the harbour and quayside.

Whitby then was a busy and important place, it had a population of nearly ten thousand; many ships were built there and employed principally in the coal trade around the coast, and in trading to the Baltic and elsewhere.

Young Cook boldly went on board the collier brig *Freelove*, bound for London and then ready for sea, being taken on as ship's boy. He must have given satisfaction for the Mate interested himself in him and got him bound apprentice to the owners of the ship, two Quaker merchants, brothers, named John and Henry Walker.

Between the years 1746 and 1755 Cook sailed in various vessels, mostly employed in the East Coast coal trade—which has been the nursery of many fine seamen. Ships in which he is known to have served were the *Three Brothers* of six hundred tons, which voyaged further afield to Liverpool, Dublin, Deptford and Norway; also the *Friendship*, of which vessel he was appointed Mate in 1752, and remained in that capacity until May, 1755, when war with France being imminent he resolved to join the Royal Navy; to use his own words "having a mind to try my fortune that way." Cook was then twenty-seven years of age, and he made his way to Wapping where he was entered as an Able Seaman on board H.M.S. *Eagle*, sixty guns, Captain John Hamer.

From the time of his joining the King's service until May, 1759 is a blank space in our history of Cook's life. *Eagle* formed part of the fleet in American waters, and under the command of Captain (afterwards Sir Hugh) Palliser, took a full share in the numerous actions of the time. The French were heavily defeated in the West Indies, and in 1758 Palliser was at the taking of Louisburg and in the reduction of the Island of Cape Breton. The islands of Guadaloupe, Descada and Marie Galante were also taken before *Eagle* returned to England in 1759.

What share Cook had in these actions is not known, but it seems certain that he must have received some promotion from the forecastle to the quarter-deck, for with his knowledge of practical navigation and previous experience as an Officer, he would no doubt have been told off to assist the Master, probably to act as a Master's Mate.

A word of explanation regarding a Master in the Royal Navy in Cook's time will be of interest. The post of Master was the survival of the sixteenth and seventeenth century practice of appointing as Captain of a war-ship, a soldier who had no knowledge of navigation, but was to command the ship and the fighting. The duties of the Master, as laid down in the Sailor's "Vade Mecum" were briefly "To navigate the ship under the directions of her superior officer, to see that the log-book was kept, to inspect all stores and provisions, to stow the hold, trim the ship, take care of the ballast, to observe coasts, shoals and rocks, and to sign vouchers and accounts. His scale of pay varied from £4 a month on board a Sixth Rate to £9 a month in a First Rate.

On *Eagle's* return, Captain Palliser strongly recommended Cook, and he was raised to the rank of Master, being appointed to H.M.S. *Mercury*, which vessel joined the Fleet under the command of Sir Charles Saunders, who in conjunction with the land forces under General Wolfe, was engaged in the seige of Quebec. A survey of the St. Lawrence River was in progress, and Cook was detailed to assist, and so well did he carry out this work that he was chosen to perform a most difficult and dangerous service.

In order to enable the Admiral to place ships against the enemy's batteries, and to cover our Army in a general attack which Wolfe intended to make, it was necessary for soundings to be taken between Orleans Island and the north shore, directly in front of the strongly fortified camp at Montmorency and Beauport. As this stretch of river was constantly under fire the operation had to be carried out during the night, and for several nights Cook and his sounding party worked through the hours of darkness, being at length discovered by the enemy who almost succeeded in capturing them; but with the precious soundings record in his possession, Cook and his men leaped ashore on to Orleans Island, having to abandon their boat to the French—a small matter, as the Admiral was furnished with sufficient information of the Channel to enable the British ships to manœuvre in safety from grounding.

At the attack on Montmorency, Cook was entrusted with the piloting of the boats, and he also conducted the embarkation to the Heights of Abraham. Such were the services which Cook performed within a few months of his appointment as Master, and it seems certain that such important work would not have been entrusted to a man unless he possessed special aptitude for it.

After the capture of Quebec, Cook was transferred to H.M.S. *Northumberland*, the flagship of Lord Colville, and here followed his first notable piece of independent work, a detailed charting of the River and Gulf of St. Lawrence. He laid numerous buoys, and upon the publication of the chart his reputation as a skilful marine surveyor was made.

In the autumn of 1762, *Northumberland* returned to England, and on December 21st of that year, Cook married Elizabeth Batts, at Barking, Essex. Their home life together cannot have lasted more than about four years in all, but the marriage is said to have been a very happy one. The house in which they lived has since been identified as No. 88 Mile End Road, London, E., which now bears a tablet recording the fact. During his later wanderings all over the world, Mrs. Cook must often have been years without news of her husband, such was the life of a sailor's wife in those days.

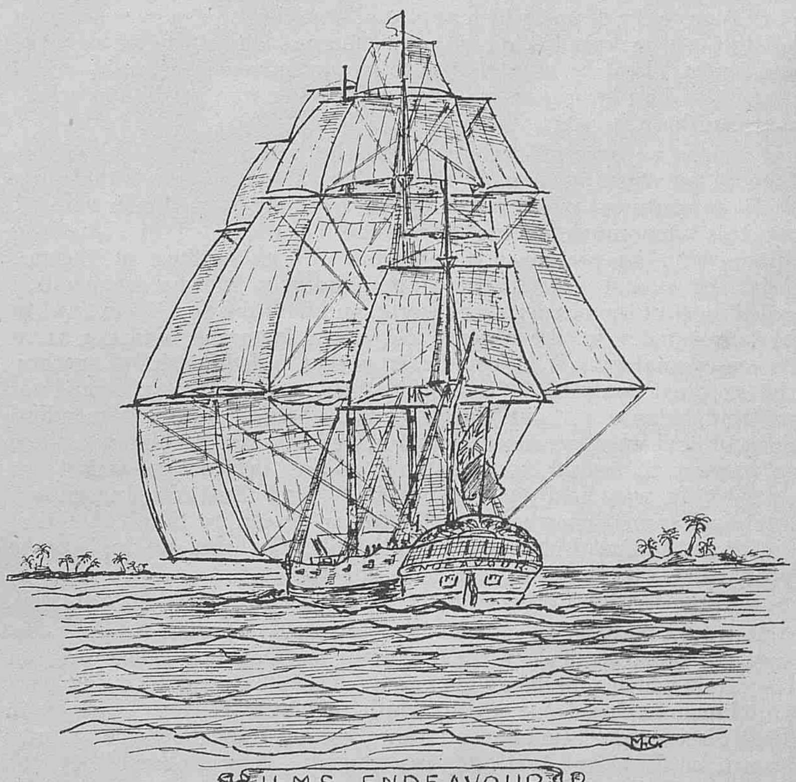
Four months after his marriage, Cook's services were applied for by Captain Graves, who had obtained a grant for the survey of Newfoundland, and in April, 1763, Cook went out and surveyed the islands of St. Pierre and Miquelon, afterwards returning to England. His old captain, now Sir Hugh Palliser, having become Governor of Newfoundland and Labrador, arranged for Cook to be appointed as Marine Surveyor of those shores, and the *Glanville*, a schooner, was placed under his command, and in April, 1764, he sailed for his station. Every Autumn he returned to England, and every Spring he went out again; this is proved by the dates of his children's births. The survey lasted until the year 1767, and during these four years he carried out a great amount of surveying, his charts of Newfoundland and Labrador not being wholly superseded till a comparatively recent period. Many of the marks which he erected for surveying purposes are still visible and recall the memory of their author. Cook also began to make his reputation as an astronomer and mathematician, by observing an eclipse of the sun, his results being communicated to the Royal Society in a paper entitled "An observation of an Eclipse of the sun at the Island of Newfoundland, 5th August, 1766, with the Longitude of the Place of Observation deduced from it."

The name of James Cook was now favourably known in two important quarters—at the Admiralty and by the Royal Society—and it was due to this conjunction of Cook's own talents and to circumstances, that the decisive step was taken which made him the greatest of Nautical Explorers.

In the Autumn of 1767 Cook returned home, his work on the north-east coast of America completed, and thus the second chapter of his life may be said to have closed. He was now thirty-nine years of age, but the best part of his life was before him, all its honour, its highest interests, its greatest rewards. The man was now ready, his chance came to him and he proved himself equal to his fortune.

The Royal Society, discovering that a transit of Venus over the Sun's disc would occur on June 3rd, 1769, and that this event would be best observed from a position in the central South Pacific Ocean, drew up a memorial to King George the Third, praying that an expedition might be sent out, as the occasion was important for both Astronomy and Navigation. The Crown agreed to provide the expenses and the Admiralty a ship. Mr. Alexander Dalrymple, a well-known student and writer on Geography, and Fellow of the Society, was proposed to take charge of the scientific work, and consented to go, but finding that he would not also be in command of the ship, he refused the appointment. The Admiralty then cast about for an Officer who could not only command the ship, but also conduct the scientific purposes of the expedition. Their choice fell upon James Cook, Master in the Royal Navy, then home and available. Mr. Stephens, Secretary to the Admiralty, recommended him, and he was promoted to the rank of Lieutenant and appointed to command the expedition.

The choice of a suitable ship being left in Cook's hands it is not surprising to learn that it was a collier, built by his old friends of Whitby. The *Endeavour*, a cat-built barque of 368 tons, had round bluff bows and a deep wide waist, tapering towards the stern; she was four years old and from her roominess and excellent qualities as a sea-boat, particularly well fitted for the work of exploration which was to be carried out in addition to the observation of the transit. Her build and draught also permitted her to take the ground or be laid on shore with more safety than other vessels of equal size. She was sent to Deptford Dockyard for fitting out, and Cook had the copper sheathing replaced by wood, as repair to copper was more difficult. The voyage was expected to occupy two years and she was victualled for eighteen months, and took on board ten carriage guns and twelve swivel guns, with good store of ammunition and other necessaries.



H.M.S. ENDEAVOUR

The complement of Officers and men of H.M.S. *Endeavour* totalled eighty-five and consisted of Lieutenant Cook in command, two Lieutenants, a Master and two Mates, three Midshipmen, Surgeon and Mate, Gunner, Clerk and Steward, Carpenter and Mate, Armourer, Boatswain and two Mates, Sailmaker, Cook, two Quartermasters, forty-one Able Seamen, twelve Marines and nine Servants.

A party of Scientists also accompanied this expedition, and accomplished very much for the benefit of Natural History during the voyage. They consisted of Charles Green, one of the Assistants at Greenwich Observatory, Joseph Banks, F.R.S., a young gentleman of large fortune, who, a Botanist of great accomplishment, was assisted by Dr. Solander from the British Museum, and a retinue of Naturalists and Artists.

Although the observation of the transit was given out to be the purpose of the voyage, yet it was by no means the only one, and in the end proved relatively of little importance. To quote from COOK's instructions "And whereas there is reason to imagine that a continent, or land of great extent, may be found to the southward of the tract lately made by Captain WALLIS in His Majesty's ship *Dolphin* (of which you will herewith receive a copy) or of the tract of any former navigators in pursuits of the like kind; you are therefore required and directed to put to sea with the bark you command, so soon as the observation of the transit of the planet Venus shall be finished, and observe the following instructions." He was to proceed to the southward in order to discover the continent as far as latitude 40° S., unless it was sooner met with. As great an extent of the coast as possible was to be explored and its peculiarities noted; together with the nature of the soil and all its products, of which, where possible, specimens were to be brought back. The people met with were also to be carefully examined, their friendship and alliance cultivated, and trade opened. Furthermore, COOK was to take possession of convenient situations, or if the land was uninhabited, to annex it in due form. But if neither the continent nor indications of it were encountered, he was to sail westward between the latitude of 35° S. and 40° S. till he fell in with the eastern side of Tasman's New Zealand. This he was to explore as far as circumstances admitted, and return home either round the Cape of Good Hope or the Horn as he judged best.

The real main object was the discovery of a Southern Continent and from this end there was to be no diversion; yet the situation of new discovered islands was to be carefully fixed, and surveys made and possession taken of any which appeared important. Emergencies were left to COOK in consultation with his Officers. On return, all logbooks and journals kept by officers were to be surrendered; nor, until official permission had been granted, were any of the crew to divulge where they had been.

Previous voyages of exploration to the South Pacific had mostly been in an attempt to find "Terra Australis Incognita," the great southern continent which was supposed by many learned men to exist. By this time much of the world had been charted in something approaching its present-day appearance. The outlines of Europe, Asia, Africa and America were approximately known; seamen had sailed most of the oceans of the world, and only the South remained to be discovered. In the absence of known facts the tendency is to reason by analogy. What could exist in that fabled South but another, the last great Continent? Symmetry demanded it; the earth could not possibly balance without it—for in the absence of this tremendous mass of land what, reasoned Mercator, and others after him, was there to prevent the world from toppling over to destruction amidst the stars? It was held by some that "Terra Australis Incognita" stretched from somewhere in the Indian Ocean to South America, and from the East Indies to the South Pole. To some geographers the probability was that this continent adhered to the southern coast of New Guinea, whilst others drew a strait between the two countries.

It would perhaps be as well here to briefly mention previous discoverers of Australia—In 1606, Torres, a Spaniard, sailed through the strait which now bears his name; whilst between 1618 and 1627 Dutchmen explored the north, south and west coasts. TASMAN in 1642 discovered Tasmania and New Zealand. In 1655 what is now known as Western Australia was named "New Holland" by the Dutch. WILLIAM DAMPIER, in 1687 and again in 1699 partially explored the west and north-western coasts when in search of gold. Subsequent voyagers added little to the knowledge of the continent, but discovered some of the island groups in the South Pacific. Thus when COOK sailed on his first voyage in H.M.S. *Endeavour*, his chart would have shown only the western, and part of the southern and northern coasts of Australia; part of Tasmania, and just the small angle of New Zealand skirted by TASMAN.

In reading the accounts of COOK's three voyages one is struck by the great difference in literary style between them. COOK's own journals were written with a seamen's straightforward directness and simplicity, for as he mentions in the introduction to the journal of his second voyage—"the public must not expect from me the elegance of a fine writer or the plausibility of a professed bookmaker but will, I hope, consider me as a plain man, zealously exerting himself in the service of his country, and determined to give the best account he is able of his proceedings."

The official narrative of the first voyage, produced by Dr. HAWKESWORTH, is a clumsy compilation from COOK's journals, and is extremely voluminous. It is so decorated with remarks and sentiments, mostly classical, that the reader feels quite bewildered at such writing from a seaman, until the explanation is realized. The editor of the second voyage, Dr. DOUGLAS, Bishop of Salisbury, on the other hand, gives COOK's own words without alteration, and in this account we, as it were, find the man himself and hear his voice. When one reads this narrative it is hard to understand how Dr. HAWKESWORTH can have been allowed to attempt an improvement on COOK's own style. The account of the third voyage, from which COOK never returned, was also edited by Dr. DOUGLAS, but in the first part written by COOK the Bishop has incorporated descriptions and observations from the journal of Mr. ANDERSON, so that the directness and simplicity of COOK's own narrative of the second voyage are missing. The latter part following COOK's death, was written by Captain KING.

Merely to mention a list of places visited and results achieved makes dull reading; but COOK's voyages were so extensive that we are compelled to confine ourselves to the barest summary, and can only touch upon a few of the interesting incidents which occurred.

The Royal Society provided the instruments needed for their observations, but it is surprising to find that although in 1765, JOHN HARRISON had been awarded £10,000 on the successful trial of his chronometer, that no chronometer was supplied by the Admiralty to *Endeavour*, and it was the task of COOK and his officers to fix their position by means of lunars—a laborious method and one in which a reasonable degree of accuracy was only possible to an expert.

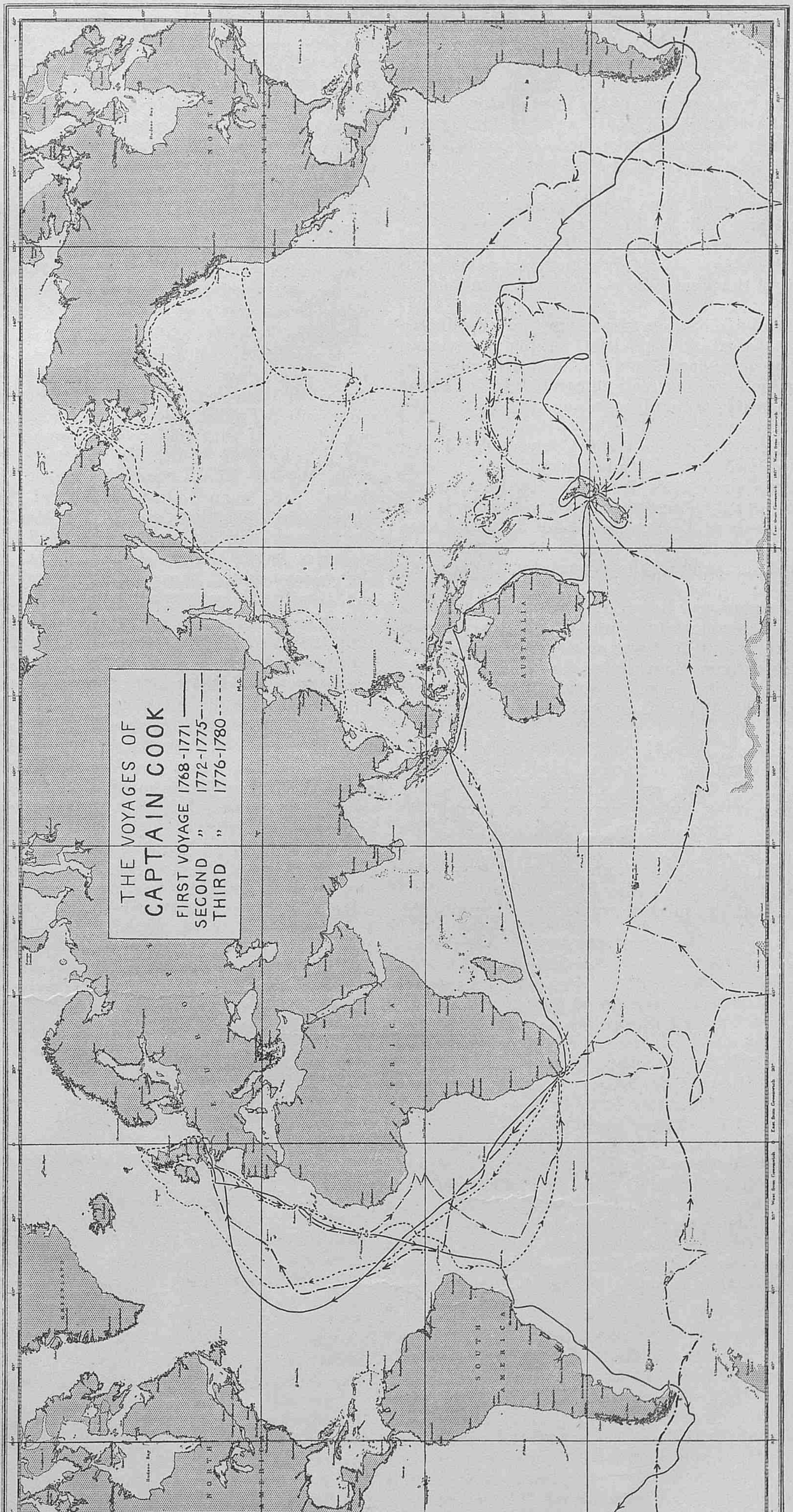
H.M.S. *Endeavour* sailed from London on the 30th July, 1768, and finally from Plymouth on August 26th. Calls were made at Madeira and Rio de Janeiro, at which port there was difficulty with the Viceroy, who accused the crew of smuggling and when told of the purpose of the voyage imagined that the transit of Venus was the "North Star passing through the South Pole." COOK stayed on board ship and employed his leisure in drawing a plan of the harbour. On December 7th the voyage was resumed, and on the 14th January, 1769, COOK entered the Strait of Le Maire, anchoring in the Bay of Good Success, on the south-east corner of Tierra del Fuego, on the 15th. Here BANKS, SOLANDER, GREEN and others went on shore for botanical specimens, but were overtaken by a heavy snow-storm, in which two servants were frozen to death and SOLANDER was with difficulty kept from a fatal sleep. Yet next day the vegetation was a delight, celery and scurvy grass were collected in great quantities, and the ship being completed with water and wood sailed to the south-west round Cape Horn.

The first weeks in the Pacific were uneventful, several islands were sighted, and on the 13th April, *Endeavour* anchored in Matavai Bay, Tahiti. An observatory was erected at "Point Venus," and a fort built. The natives, though friendly enough, were "prodigious expert" at thieving. They even stole the astronomical quadrant, and it was only regained, fortunately uninjured, after a long chase into the interior of the island. On June 3rd, the transit of Venus was successfully observed, and COOK then sailed round the island and charted the coast in detail, afterwards spending some months exploring the other islands of the group of which Tahiti is one, giving them the name of the Society Islands.

The task which now lay before him was to find either the great southern continent or the eastern coast of New Zealand. He sailed south until latitude 40° 22′ was reached, but there was no sign of land, and the heavy southerly swell was all against the chances of falling in with land in anything near his present latitude. He sailed to the westward, and on October 7th the North Island of New Zealand was sighted by a boy, NICHOLAS YOUNG, the point seen being named by COOK, "Young Nick's Head."

From this date until the end of March, 1770, *Endeavour* remained on the coasts of New Zealand, the islands being circumnavigated, surveyed and charted, particular mention being made of Cook Strait, the channel separating the North and South Islands. The native Maoris were found to be generally warlike and unfriendly, in contrast to the Society Islanders, but like them, also addicted to purloining anything they fancied, including on one occasion COOK's sheets, which, being washed, were trailing overboard from the stern.

A complete running survey was made of the Islands of New Zealand, and in less than six months 2,400 miles of coast was charted, in spite of adverse and squally weather, which several times blew the ship out of sight of land and split several sails.


THE VOYAGES OF
CAPTAIN COOK
FIRST VOYAGE 1768-1771
SECOND " 1772-1775
THIRD " 1776-1780
M.C.
NORTH AMERICA
Hudson Bay
EUROPE
AFRICA
ASIA
PHILIPPINES
AUSTRALIA
SOUTH AMERICA
GREENLAND

His work on these coasts completed and New Zealand now numbered among the possessions of His Britannic Majesty, there lay before Cook the choice of route by which he should return home, which it will be remembered in his instructions was left to his discretion. A council of Officers was held, and the routes by way of the Cape of Good Hope, Cape Horn, direct to the East Indies, or to sail west for further discoveries. It was unanimously decided to take the latter course, little knowing of the perils from the Great Barrier Reef which lay in store for them.

On March 31st, 1770, Cook sailed from Cape Farewell and steered to the westward, and on April 19th the East Coast of New Holland (Australia) was sighted, but it was not until the 28th that a suitable anchorage could be found in Botany Bay (near Sydney), the name being given by Cook on account of the great variety of strange plants found there by the scientists.

The natives were found to be of an even lower type than the Maoris, and appeared quite unconcerned at the advent of the discoverers. Cook, in his journals, always gave long accounts of all natives met with, describing their manners and customs, all illustrated by excellent drawings, but in these notes it is hardly possible to mention the inhabitants which were encountered.

Sailing on to the northward up the coast Cook explored and examined it for upwards of two thousand miles, naming many bays, headlands and islands. On a virgin coast, in waters utterly unknown, the little *Endeavour* found herself entangled among the islands, shoals and sharp coral fangs of the Great Barrier Reef. For days at a time Officers were stationed at the masthead conning the ship, gazing anxiously ahead for swirls in the water, or the greenish tinge betokening shallow patches.

Notwithstanding all precautions, however, *Endeavour* struck a coral reef on June 10th. Unfortunately it was high water, and she remained immovable. Cook writes : " It was an alarming and terrible circumstance and threatened immediate destruction." Even if the ship were got off with a large leak, she might sink at once, the boats would not take all hands, and the land six or seven leagues away held nothing of promise.

Everyone worked desperately, ballast, guns, old stores and everything that could be spared was flung overboard, yards and topmasts were struck, and at the second high water after going aground the ship was hove off into deep water by her bower anchors carried out astern. Now the pumps could not gain on the leak and the ship's company was exhausted. " Fothering " was decided upon, that is to lower over the bows a sail, on which oakum and wool was sewn, covered with " the dung of our sheep and other filth," and haul it along the bottom of the ship, so that this mixture would be sucked into the leak and close it. The operation was so successful that *Endeavour* was soon pumped dry and stood in for the land, where a small river was found, " Endeavour River," and here she was beached and such repairs as were possible were made.

The stay ashore greatly improved the health of the men, and on August 6th Cook sailed north again along the coast. It is impossible here to mention the many thrilling adventures which *Endeavour* passed through at this stage of her voyage, she was many more times in danger on the Great Barrier Reef, but the Captain's sure judgment and sound seamanship carried her through in safety.

Cook was now approaching the latitude of the Southern Coast of New Guinea, and was searching for a possible strait between that island and New Holland. On August 21st the land began to look very narrow, and at noon the opening of a passage to the westward into the Indian Ocean was seen.

Cook and a party landed upon a small island at the south-east end of the passage, and " As I was now about to quit the eastern coast of New Holland, which I had coasted from latitude 38° to this place, and which I am confident no European had ever seen before, I once more hoisted English colours, and though I had already taken possession of several particular parts, I now took possession of the whole eastern coast from latitude 38° to this place, latitude 10½° S., in right of his Majesty King George the Third, by the name of New South Wales." (So named after a supposed resemblance to the coast of Glamorganshire.) Cook named the island " Possession Island," and the passage " Endeavour Strait," which is actually an opening south of Torres Strait. He sailed through, and on August 29th, 1770, New Guinea was sighted, thus proving beyond all doubt that New Holland and New Guinea were separated.

Calls were made at the islands of Timor and Savu, and on October 10th they arrived at Batavia, where the Dutch helped with their badly-needed refit. Cook writes : " What anxieties we had escaped in our ignorance that a large portion of the keel had been diminished to the thickness of the under leather of a shoe ! "

On December 20th, *Endeavour* sailed on her long passage home. Dysentery contracted at Batavia was prevalent and scurvy appeared for the first time during the voyage. Thirty men died on the passage across the Indian Ocean, making a total of thirty-seven for the entire voyage. On March 6th, 1771, the land near Cape Natal was sighted, and on the 15th they arrived at the Cape of Good Hope. After refitting and recuperating his invalids, Cook sailed for England. On June 10th the Lizard was sighted—again by the boy Nicholas Young—and two days later the gallant *Endeavour* passed the white cliffs of Dover and came to anchor in the Downs.

(*To be continued*)

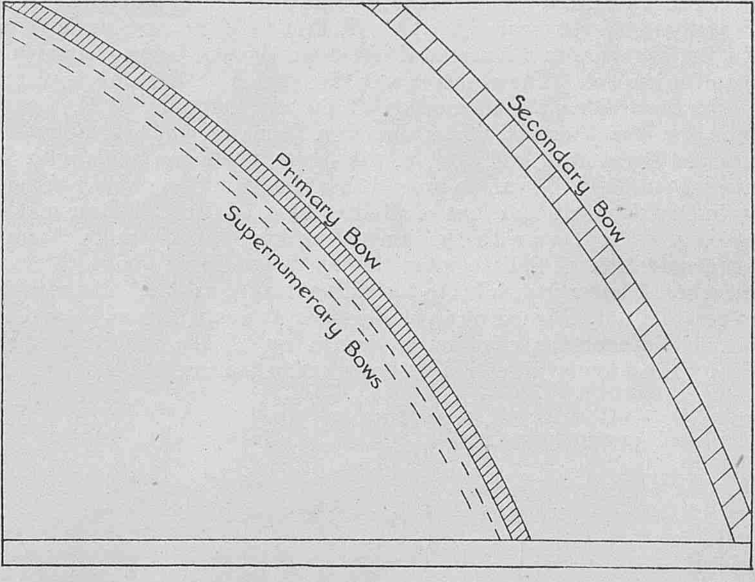
RAINBOWS AND FOG BOWS.

Prepared in the Marine Division by E. W. Barlow, B.Sc.

The rainbow is one of the most beautiful of natural phenomena and also one of the most familiar. The white rainbow or fog bow seen in mist or fog is formed in the same way but is less often observed. The ordinary coloured rainbow is seen when the sun shines upon raindrops, the observer being between the sun and the rain. The centre of the circle of which the rainbow forms an arc, the observer's eye and the sun lie on a straight line. The rainbow is produced by the refraction and reflection of light within each of a great number of raindrops. It should be noted that no two observers see the same rainbow. Even if two persons are standing quite close together the rainbow seen by one is produced by different raindrops and is in a slightly different position in the sky to that seen by the other, just in the same way that each person has a different shadow. The drops giving rise to a rainbow may be at any distance from the observer, from a few yards to several miles. Rainbows or fragments of bows are formed also by waterdrops other than those of falling rain. Familiar examples are the coloured arcs seen on sea-spray or on the spray from a garden hose, while beautiful rainbows occur in connection with the spray of waterfalls.

The Secondary Rainbow. There is nothing unusual about the formation of a second fainter rainbow outside the main one. The brighter bow is called the primary rainbow and the fainter outer bow the secondary rainbow. These bows are shown in Figure 1. Providing that raindrops are present in the requisite angular direction from the observer the secondary bow is inevitably formed, concentric with, and about 9° outside, the primary bow. If the conditions are such, however, that the primary bow is not very bright the secondary bow may be too faint to be seen. In a bright well-developed rainbow the primary bow usually shows the sequence of the spectrum colours with the exception of indigo, which is nearly always absent. The colours seen are therefore in the following order :—Violet, blue, green, yellow, orange and red, the red being on the convex upper side of the bow and the violet on the concave lower side. In the secondary rainbow the same sequence of colours is seen, but reversed, with violet on the convex upper side and red on the concave lower side. It is of interest to note that the colour sequence of a primary rainbow is the same as that of a solar or lunar corona, "red outside," while that of a secondary rainbow is the same as that of a solar or lunar halo, "red inside." The primary rainbow is formed by means of one internal reflection of light in each raindrop, while the secondary rainbow is formed by light which has been twice reflected inside each raindrop. The space between the two bows appears somewhat darker than the rest of the sky in the neighbourhood of the bows. On rare occasions brightly coloured bands like portions of rainbows have been observed crossing the space between the two bows but no satisfactory explanation of this phenomenon has yet been given.

Supernumerary Bows. One or more other bows are frequently seen just beneath the primary bow, either in contact with the primary bow or as narrow bands of colour separated by short colourless intervals from one another and from the primary bow. These are called supernumerary bows, or sometimes supplementary bows, and are shown in Figure 1. Usually the first supernumerary bow is much fainter than the primary bow, while other supernumerary bows if visible are successively fainter still. A supernumerary bow does not however show the full range of spectrum colours; violet and pink, green and purple or blue and pale red are the most usual combinations, but some of the bows consist of a single colour only. The supernumerary bows may appear and disappear, often quite rapidly, and they are liable to changes of colour. In the rainbow observed by S.S. *Inkum* (The Marine Observer, Volume VII, 1930, September, page 192) a supernumerary bow is thus described :—" The peculiarity of the phenomenon observed was that, under the primary, clear sky was visible whilst at an angular distance of 4° away from it could be seen a thin purple stripe, visible 3 minutes." Sometimes the supernumerary bows are unusually bright. This was the case with a rainbow observed by Captain A. Carpenter, R.N. on November 9th, 1911 at Sanderstead, Surrey. He saw the primary and secondary bows and there were supernumerary bows in contact with the primary and with each other. The supernumeraries were so bright that they together with the mauve and violet bands of the primary bow were the most intense colours visible.

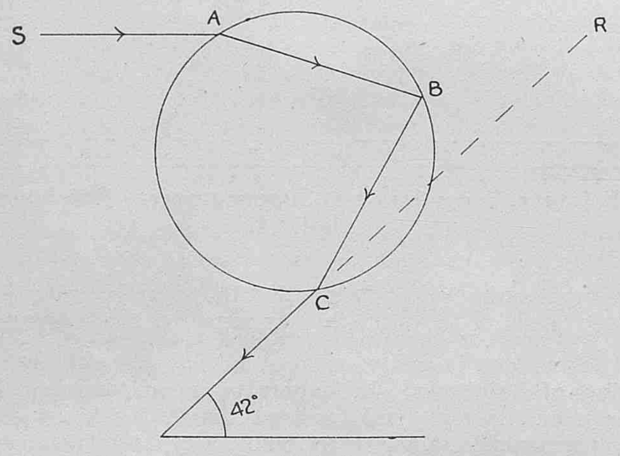


Primary, Secondary and Supernumerary Rainbows.
Figure 1.

Variation of Rainbows. In favourable circumstances, with a low, bright sun and heavy cloud for background, a rainbow is a very striking phenomenon, the colours being very bright and luminous. It is however a common error that all rainbows look alike. The colours are not always the same. In some rainbows only four or five colours are seen, sometimes only three. The width of the whole bow varies in different cases and the relative width of each colour band may also differ. There may be considerable differences also as regards the purity of the colours and their relative brilliancy. Supernumerary bows also differ greatly in the colours visible and in their purity and width. These variations, which as will be seen presently are due to the different sizes of raindrops, are not only exhibited between one rainbow and another seen at a different time or place, but may exist between different parts of the same rainbow. Thus inequalities of width or colour may be observed between the upper and lower parts of the same bow or changes in the bow as a whole may take place owing to a change in the character of the rain falling. Different parts of a bow at the moment of observation may even be portions of circles of different radii. As mentioned above the supernumerary bows are especially liable to changes during an observation. One observation published in The Marine Observer, made in H.M.S. *Ormonde* (Vol. VI, 1929, December, page 264) gives a good description of colour changes in a rainbow. The full range of coloration was at first seen, at 09.18 Standard Time (off Colombo), only the apex of the bow being seen above the horizon. " This rainbow gradually became more and more washy in appearance, showing brighter in places and then commenced breaking up, green became predominant, blue, indigo and violet disappearing and left side of bow becoming yellow. At 09.23 the whole bow became a yellowish-pink and completely disappeared at 09.26."

Formation of a Rainbow. The theory of the formation of a rainbow is mathematical in character and cannot be fully explained here. The general explanation was apparently first given by Theodorich about 1311, and Antonio de Dominis demonstrated the rainbow experimentally, using globes filled with water, at the end of the sixteenth century. Descartes, in 1673, put the theory on a mathematical basis and pointed out that the rainbow was produced by a concentration of the rays of light in certain directions. Sir Isaac Newton, by his discovery of the different refrangibility of the various coloured rays of which white light is composed, was able to explain the colours of the rainbow in his " Opticks," published in 1704.

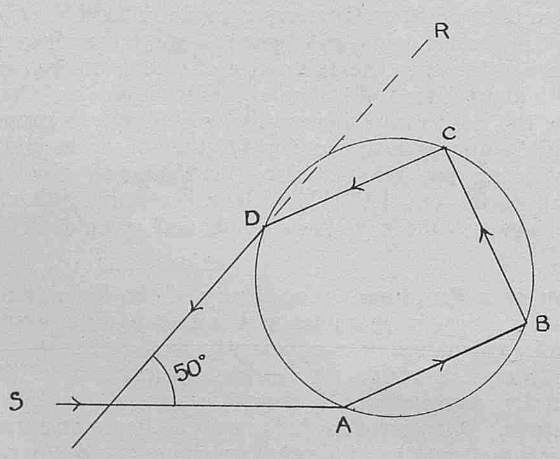
The formation of the primary rainbow is illustrated in Figure 2, which shows the path of light through a single raindrop. Some of the sunlight coming from the direction S enters the drop by refraction at A, is reflected from the far side of the drop at B and emerges by refraction from the near side at C. In Figure 2 the sunlight is shown entering the drop in a horizontal direction, the sun being presumed to be on the horizon. The observer sees the portion of the rainbow formed by the drop along a continuation of the ray emerging at C, that is, along the direction CR. This direction forms an angle of about 42° with the horizontal, and also, in the figure, the same angle with the entering sunlight. It can be proved that the light thus passing through a raindrop does not come out in all directions, but only in those making angles of 42° or less with the sun's direction. Furthermore, there is a concentration of light coming out at the angle of about 42°, that emerging at lesser angles being too diffused to be visible. The rainbow is therefore only formed by rays emerging at about this angle and the complete arc of the rainbow is formed by all the raindrops which occupy this angular direction with respect to the sun and the observer.



Path of Light through a Raindrop forming Primary Bow.
Figure 2.

The colours of the rainbow are due to the fact that light of different wave-lengths is refracted to slightly different directions at the points of refraction A and C. White light entering at A therefore emerges at C dispersed into a spectrum. The angle of 42° given above is the radius of the red band of the primary rainbow, while the radius of the violet band only slightly exceeds 40°. The usual width of a well-developed primary bow is therefore about 1¾°.

The passage of light through a raindrop for the formation of a secondary bow is shown in Figure 3. There are two internal reflections, at B and C, and it is the second reflection which reverses the order of the colours from that seen in the primary bow. The width of the secondary bow is greater than that of the primary bow and is normally about 3°.



Path of Light through a Raindrop forming Secondary Bow.
Figure 3.

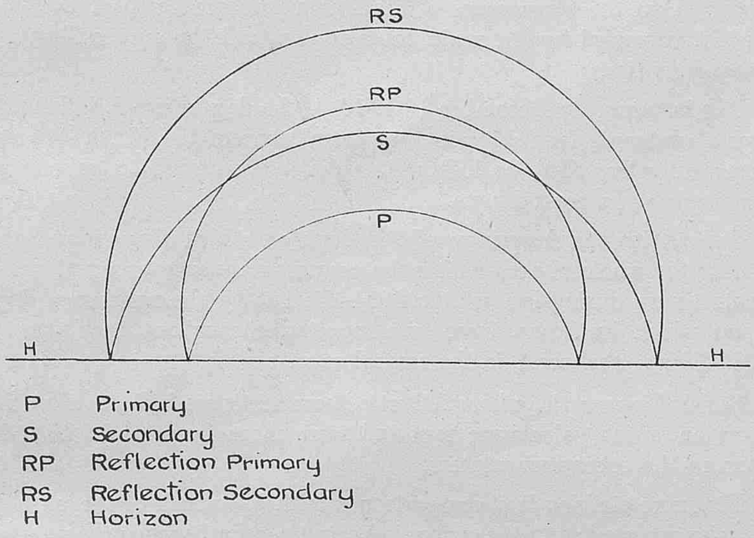
Conditions for Rainbow Observation. When the sun is on the horizon the altitude of the highest part of the primary rainbow is 42°. The higher the sun is in the sky, the lower is the altitude of the rainbow, and if the sun is at an altitude of 42°, the apex of the primary rainbow is on the horizon. An interesting observation of this kind was recorded by H.M.A.S. *Moresby* in Volume IV, 1927, September, page 169. A short segment of the apex of the primary bow was seen on the horizon, with a considerable arc of the secondary bow above it. Rainbows can therefore never be seen at mid-day in summer in temperate or tropical latitudes. On the other hand, rainbows are comparatively rare in winter, although the sun's altitude is lower, as the necessary condition of sunshine, together with falling rain, does not often occur in the typical cyclonic weather of that season. Thunderstorm rain passing away from the observer gives the most favourable circumstances for the production of bright rainbows, which are therefore most common in the late afternoons or evenings of summer. When the observer is at ground level and the rain cloud is distant the rainbows are seen as arcs of circles always less than a semicircle, unless the sun is on the horizon, when they form semicircles. If, however, the rain is near and especially if the observer is in an elevated position, the bows will be greater than a semicircle and may even form complete circles. Examples of bows forming complete circles to the water line on each side of the ship will be found recorded by S.S. *Culebra* (Volume II, 1925, November, page 176), by S.S. *Frankenfels* (Volume III, 1926, April, page 58, and by Fishery Cruiser *Freya* (Volume IV, 1927, September, page 170). Rainbows forming complete circles may also be seen at waterfalls where the conditions are suitable.

Other Rainbows. We have seen that the primary and secondary bows are formed by light undergoing one or two reflections, respectively, within the raindrops. Light may, however, enter a raindrop in such a way that it undergoes three, four or more reflections within the drop, but at each reflection there is considerable loss of light, this being the reason that the secondary bow is fainter than the primary bow. Actually, however, a third bow is formed by three internal reflections, a fourth bow by four, and so on, but generally speaking the resulting bows are too faint to be seen. There is some evidence that the third bow has been seen, situated at the back of the observer, between him and the sun. The fourth bow is also between the observer and the sun, but has certainly never been seen. The fifth bow coincides very nearly with the secondary bow in position, but has the colours in the same order as the primary bow, red outside. This very faint bow is stated to have been seen, but very rarely. The sixth bow is inside the primary, but is far too faint to be observed. S.S. *Lancastria* recorded a third bow 10° outside the secondary bow (Volume VII, 1930, December, page 242), but it is difficult to interpret this observation as the order of the colours in the third bow was not stated and the position does not agree with any of those mentioned above.

Size of Raindrops. The theory of rainbows referred to above, which may be found given in full in text books of optics, gives no explanation of the formation of the supernumerary bows nor of the variations of colour and angular radii of the main bows. Furthermore, the angular radii which have been derived from actual observation, those given above, differ slightly from what they should be by the simple geometrical theory, worked out in accordance with the laws of reflection and refraction of light. A more complete theory based on the interference of light waves was worked out by Potter and Airy in the early part of the nineteenth century and was completed by Mascart and Pernter. By this means all the observed phenomena have been accounted for, including the supernumerary bows which are sometimes seen on the outside of the secondary bow, but rarely on account of their faintness.

The colour differences of rainbows depend upon the size of the raindrops. The brilliant bows showing all colours from red to violet are formed by drops greater than 1/25th inch in diameter. With smaller drops, 1/80th inch in diameter, or less, there is no red colouration, the outer band of the primary being orange or yellow. The smaller the drops the wider the supernumerary bows become and the more separated they are from one another and from the primary bow.

The Fog Bow. During mist or fog, a pure white bow is sometimes observed opposite to the sun, usually of ill-defined character and faintly tinged on the outside with red or orange and on the inside with blue or violet. A secondary white bow may be seen with these colours reversed. Supernumerary bows have also been observed, with faint coloration reversed to that of the primary bow. The fog bow, which is sometimes called a white rainbow, or Ulloa's Ring, is produced in the same way as the ordinary rainbow but owing to the smallness of the waterdrops, about 1/500th inch in diameter, the colours overlap and the bow appears mainly white. Three concentric white bows have sometimes been observed. Two observations of fog bows have been published in THE MARINE OBSERVER, recorded by S.S. *Minnetonka* (Volume VIII, 1931, June, page 125) and by S.S. *Protesilaus* (Volume XII, 1935, January, page 8). In the latter observation, made on January 26th, 1934 in the North Pacific Ocean, a triple fog bow was seen during mist.



Direct and Reflection Rainbows.
Figure 4.

Reflected and Reflection Rainbows. If an expanse of calm water lies between the observer and the rainbow, a reflected inverted image of the rainbow will be seen in the water. This is a reflected rainbow. Where on the other hand the sun is reflected from a sheet of calm water situated behind the observer, the reflected sun acts as a second source of light, giving a primary and secondary bow in the same way that the sun itself does. Such a rainbow is called a reflection rainbow, and is illustrated in FIGURE 4. The complete observation of all four bows is rare. The primary bows intersect one another on the horizon and so do the secondary bows.

Lunar Rainbows. These are formed in exactly the same way as those produced by the sun but are naturally much fainter. Lunar rainbows are often observed as whitish in colour but these are not true white rainbows, the whiteness arising from the fact that the human eye cannot distinguish colour in faint light. The secondary and supernumerary bows are formed also by the moon but it is doubtful if they are ever bright enough to be seen. The nineteen observations of lunar rainbows which have been published in THE MARINE OBSERVER up to date contain no mention of anything but the primary bow. Lunar rainbows, while not rare phenomena, are infrequent because of the comparatively short periods that a bright moon is above the horizon. In the observation made by S.S. *Inanda*, published in the present number, changes both in the width of bow and in its coloration were seen to take place, and similar changes were recorded by S.S. *Port Denison* (Volume VI, 1929, May, page 105).

It has always been stated in books on meteorology, either that lunar rainbows are always whitish, or that their coloration is difficult to detect. Collections of observations of lunar rainbows have been difficult, if not impossible, to find but we now have a total of eighteen observations made in various parts of the world to test the truth of these statements. The nineteenth observation gives no statement as to whether the bow was coloured or white. Of the eighteen lunar rainbows twelve showed colour and six were white; in other words colour was more or less easily distinguishable in two cases out of three. While this proportion of observations of colour might not remain exactly the same if a much larger number of observations were available it is at once obvious that the statements previously made are erroneous. The table given below contains the colours actually observed in lunar rainbows, though the further details given in many cases as to width of bands and their relative brightness are not reproduced here. Of the six white rainbows, which are not included in the table, the descriptions are "white," "pale white," "milky-white" and "silvery white."

Colour of Lunar Rainbows.

Ship.	Date of observation.	Place.	Colour.
Socrates ...	Sept. 10, 1927	North Atlantic Ocean	Silver, blue, green.
Port Denison	May 10, 1928	Off Queensland ...	Orange, yellow, green.
Arafura ...	Mar. 29, 1929	Off Queensland ...	Colours seen but not specified.
City of Chester	June 20, 1929	North Indian Ocean	Brownish-red (outer), heliotrope, orange.
Rotorua ...	April 30, 1930	North Atlantic Ocean	Red, orange, yellow, green, purple.
Rotorua ...	April 22, 1931	South Pacific Ocean	Red, green, orange, violet.
Huntingdon	May 25, 1931	South Pacific Ocean	Whole spectrum visible
Port Denison	May 27, 1931	Australian Waters ...	Red (outer), green, white.
Makura ...	Sept. 12, 1932	South Pacific Ocean	White (outer), deep brownish-red, yellow
Inanda ...	June 27, 1934	North Atlantic Ocean	Red (outer), yellow green.
Mahronda ...	June 29, 1934	North Atlantic Ocean	One indefinable colour, greyish-white, yellowish-green.
Inanda ...	Jan. 22, 1935	North Atlantic Ocean	Red (outer), orange, yellow-green.

Bows may also be formed on rain or fog by artificial light; one night in 1924 the author saw a very bright colourless bow formed over the road on heavy rain by the headlights of a car coming uphill behind him. This bow was semi-elliptical in form, probably owing to the double source of light. It should be noted that the phenomenon of iridescence, delicately coloured patches seen on high clouds in the neighbourhood of the sun, has no relation to rainbows, being formed by the diffraction of light by very small water-drops.

COMPARISON OF THE SEVERITY OF THE WEATHER IN THE NORTH ATLANTIC DURING THE LAST FIVE WINTERS.

By Captain L. A. Brooke Smith, R.N.R.

Nearly every winter statements are made in the press that Captain So-and-so has experienced the worst weather in the North Atlantic that he has known in his career of a given number of years at sea.

Probably Captain So-and-so has made some unguarded remark which the press reporter has not failed to embroider.

The fact is that to compare accurately the severity of weather at sea on different voyages or in different seasons, or experienced during the careers of different shipmasters, whether by memory or from carefully kept logs and statistics, is at all times a difficult matter, and there is probably no method yet devised which is infallible.

Memory may be misleading, though usually memory of very bad weather is probably more true with those who are responsible for the navigation of ships than with others.

A common method of making the comparison by statistics of the frequency of gales in a region at sea, is to take the total number of observations of winds of all forces, including calms, logged by ships making returns to a weather office, during a month, and to calculate the percentage of these observations which were of force 8 and above; that is, to obtain the percentage of all observations of wind and calms which were gales.

Now since a number of observing ships may have been in close proximity to each other, when there was a gale, this gale would be counted a number of times; so that unless there are sufficient observations well distributed both for position and for every day the percentage may not give a true frequency for the whole month or region.

Another method used has been to give the number of gale reports received from ships in an ocean during a month. Since numbers of ships may report the same gales, and the number of ships at sea varies considerably, this method cannot be considered at all reliable for making comparisons.

The percentage frequency method is perfectly sound. Any method fails if the observations are not sufficiently distributed for position and date. The sailorman finds it very useful to know that there were gales on so many days in a month.

Until recent years the distribution of British observing ships often was not good enough for this method which we have used in making this comparison for the past five winters.

Since May 1st, 1930, a position Chart of " A " Selected Ships has been kept day by day, upon which at noon the estimated position of every British " A " Selected Ship at sea in all oceans has been shown; and since May 1st, 1930, there have always been a number of British " A " Selected Ships at sea recording and reporting weather observations in the North Atlantic north of Latitude 36° N. on the main trade routes.

Though at times these British " A " Selected Ships may be so far apart that a gale may pass between them, and so not be recorded, such occurrences cannot be very common.

In addition to these " A " Selected Ships there are " B " Selected Ships and other observing ships, all appointed according to their trade to obtain the best possible distribution of observation, many of them navigating the North Atlantic. All these observations have been used in this comparison. Nevertheless, it cannot be guaranteed that at all times since May 1st, 1930, the North Atlantic north of Latitude 36° N., on the trade routes, was sufficiently covered by British observing ships to ensure that every gale was reported.

The Table overleaf indicates the number of days on which gales were reported, in the three zones of the North Atlantic north of Latitude 36° N. traversed by the main trade routes, and the curves illustrate these statistics.

For instance, on December 13th, 1934, the day before S.S. *Usworth* was abandoned, four ships in the central zone of the North Atlantic reported gales. This is indicated as one day on which gales were reported in the central zone.

Judged by the frequency of the days on which there were gales during the whole of each winter the greatest frequency occurred in the central zone during last winter, 1934–35; but by the number of days upon which hurricane force was reported throughout each winter, 1932–33 was the worst, in the central zone.

Generally over the whole Atlantic these statistics indicate that the days on which gales were reported were more frequent in 1930–31 than in the other four winters.

Far more striking is a comparison month by month of the number of gales reported; and the curves indicate the months when the number of days on which gales were reported were most frequent, and the number of days on which the wind reached whole gale or hurricane force.

According to the evidence of these statistics, in the western North Atlantic, March, 1931, was a bad month, there being gales on 20 out of 31 days. January, 1932, in the eastern North Atlantic was a bad month, there being gales on 20 out of 31 days, and on two days the wind was at hurricane force. December, 1932, in the central North Atlantic was very bad, there were gales on 18 out of 31 days, and the wind blew with the force of a hurricane on six days.

It must be remembered that usually the wind force is only recorded at the appointed times for observation and that usually squalls and short spells of higher wind force are logged in remarks, all of which have been considered.

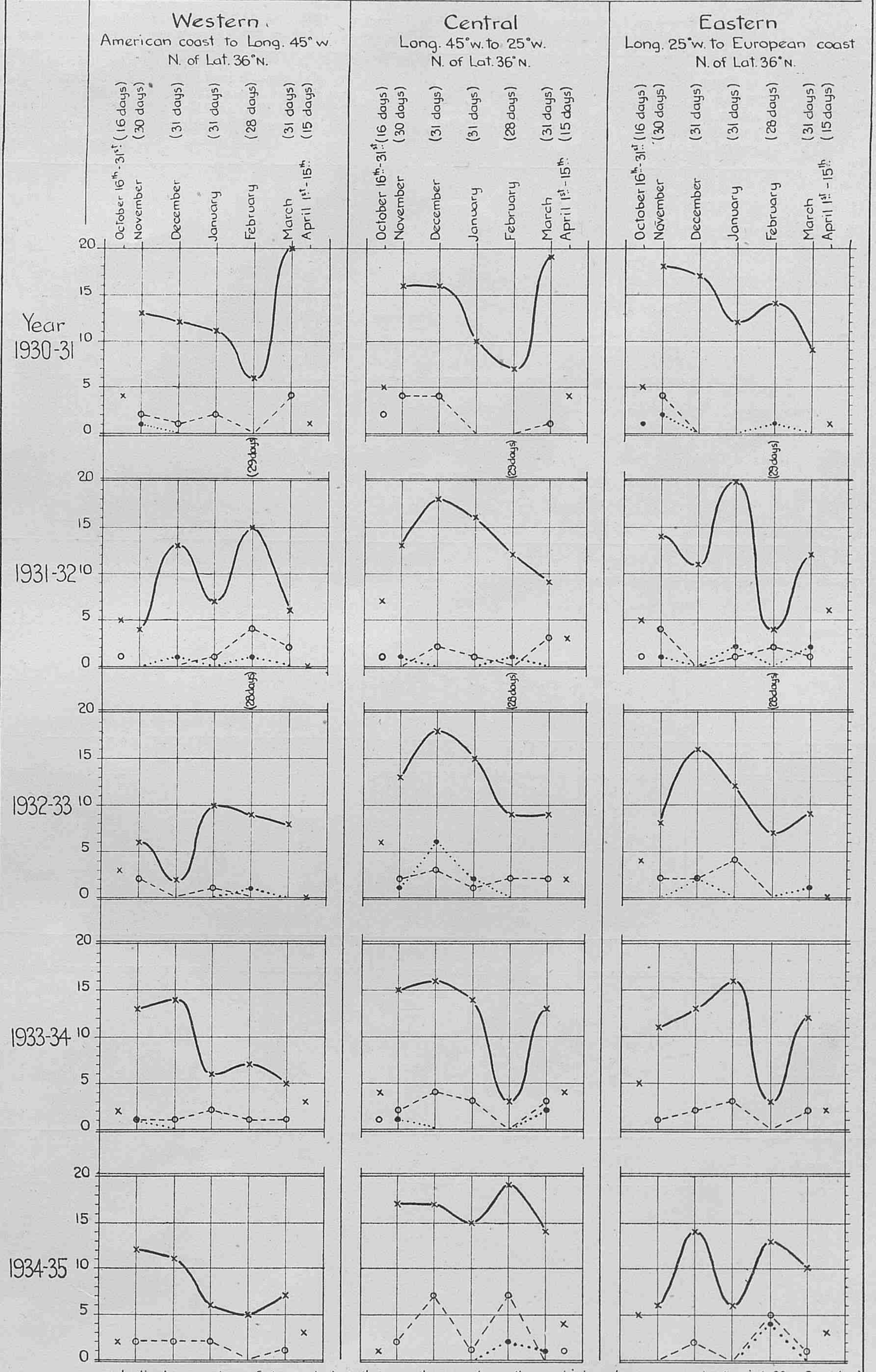
Wind may not only be a direct contributing force to inconvenience, damage, or loss by foundering of ships, but it causes the waves—sea and swell—which are the chief cause of such casualties due to weather.

A continuance of gales makes for the worst conditions; and in no part of the oceans are worse conditions reported on the trade routes than those of the North Atlantic during the winter, when a succession of gales causes heavy seas, and the veering of the wind in cyclonic storms brings about a heavy confusion of sea and swell, raising such waves that ships must be seaworthy in every respect to weather them.

The season for winter load line laid down by the International Load Line Convention, 1930, and incorporated in the Merchant Shipping (Safety and Load Line Conventions) Act, 1932, for the North Atlantic north of Latitude 45° N. between Longitude 15° W. and 50° W. and north of 60° N. from Longitude 15° W. to the Norwegian Coast extends from October 16th to April 15th, and for the remainder of the North Atlantic north of Latitude 36° N. from November 1st to March 31st.

In this Volume some account will be given of the gales in the North Atlantic which caused the foundering of three British ships during last winter.

Number of days on which Gales were reported in the North Atlantic during the months and part-months of the Winters 1930 to 1935.



× Indicates number of days during the month or part-month on which gales were reported (ie. wind of force 8 and above)

o Indicates number of days included in × when wind was reported to reach a whole gale, force 10.

• Indicates number of days included in × when wind was reported to reach hurricane force.

Number of Days on which Gales were reported by British Observing Ships in the North Atlantic, North of Latitude 36° N. during the Winter Months 1930–31 to 1934–35, excluding Coastal and Narrow Waters.

Month.	Western.			Central.			Eastern.		
	American Coast to Longitude 45°W. North of Latitude 36°N.			Longitude 45°W. to 25°W. North of Latitude 36°N.			Longitude 25°W. to European Coast North of Latitude 36°N.		
	No. of Days on which Gales were reported.	No. of Days on which Whole Gales were reported.	No. of Days when wind reached Hurricane force.	No. of Days on which Gales were reported.	No. of Days on which Whole Gales were reported.	No. of Days when wind reached Hurricane force.	No. of Days on which Gales were reported.	No. of Days on which Whole Gales were reported.	No. of Days when wind reached Hurricane force.
1930 :—									
October 16–31	4	0	0	5	2	0	5	0	1
November	13	2	1	16	4	0	18	4	2
December	12	1	0	16	4	0	17	0	0
1931 :—									
January	11	2	0	10	0	0	12	0	0
February	6	0	0	7	0	0	14	0	1
March	20	4	0	19	1	0	9	0	0
April 1–15	1	0	0	4	0	0	1	0	0
Total for Season	67	9	1	77	11	0	76	4	4
1931 :—									
October 16–31	5	1	0	7	1	0	5	1	0
November	4	0	0	13	0	1	14	4	1
December	13	0	1	18	2	0	11	0	0
1932 :—									
January	7	1	0	16	1	0	20	1	2
February	15	4	1	12	0	1	4	2	0
March	6	2	0	9	3	0	12	1	2
April 1–15	0	0	0	3	0	0	6	0	0
Total for Season	50	8	2	78	7	2	72	9	5
1932 :—									
October 16–31	3	0	0	6	0	0	4	1	0
November	6	2	0	13	2	1	8	2	0
December	2	0	0	18	3	6	16	2	2
1933 :—									
January	10	1	0	15	1	2	12	4	0
February	9	0	1	9	2	0	7	0	0
March	8	0	0	9	2	0	9	0	1
April 1–15	0	0	0	2	0	0	0	0	0
Total for Season	38	3	1	72	10	9	56	9	3
1933 :—									
October 16–31	2	0	0	4	1	0	5	0	0
November	13	1	1	15	2	1	11	1	0
December	14	1	0	16	4	0	13	2	0
1934 :—									
January	6	2	0	14	3	0	16	3	0
February	7	1	0	3	0	0	3	0	0
March	5	1	0	13	3	2	12	2	0
April 1–15	3	0	0	4	0	0	2	0	0
Total for Season	50	6	1	69	13	3	62	8	0
1934 :—									
October 16–31	2	0	0	1	0	0	5	0	0
November	12	2	0	17	2	0	6	0	0
December	11	2	0	17	7	0	14	2	0
1935 :—									
January	6	2	0	15	1	0	6	0	0
February	5	0	0	19	7	2	13	5	4
March	7	1	0	14	0	1	10	1	0
April 1–15	3	0	0	4	1	0	3	0	0
Total for season	46	7	0	87	18	3	57	8	4

WEATHER IN THE NORTH ATLANTIC, FEBRUARY 25—27th, 1935.

PREPARED IN THE MARINE DIVISION BY
COMMANDER J. HENNESSY, R.D., R.N.R.

THE weather conditions reported over the North Atlantic steamship tracks north of the 26th parallel and east of the 45th meridian during the month of February, 1935, were abnormally severe. This was especially the case during the latter half of the month when reports of gales reaching force 10 to 12 of the Beaufort notation were not infrequent.

It was during this period of heavy gales that disaster overtook the S.S. *Blairgowrie* of Glasgow. The *Blairgowrie*, a vessel of 3,259 tons, laden with a full cargo of anthracite duff or dust, left Swansea on 16th February bound for Boston. According to wireless messages her steering gear broke down on February 26th at 5.48 p.m., and the hatches to No. 1, 2 and 5 holds were successively stove in; she also reported that a bulkhead and the bridge front door required shoring up. On the 27th, at about 12.16 a.m., in approximately Latitude 48° 20′ N., Longitude 27° 01′ W. the ship foundered with the loss of her entire crew of 26 hands.

The following weather charts are made from the observations taken by ships of the Voluntary Observing Fleet and show the weather conditions which prevailed over the central and eastern regions of the North Atlantic at 1200 G.M.T. on the 25th, 26th and 27th February, 1935. On each chart the *Blairgowrie's* last reported position is indicated by a +.

CHART 1.—On the 25th February, 1935, at 1200 G.M.T. there was a depression centred northward of Latitude 47° N., Longitude 39° W. A strong gale was reported by *Majestic*, situated to the south of centre and west of *Blairgowrie's* position.

CHART 2.—On the 26th February, 1935, at 1200 G.M.T., the depression having moved eastward during the past 24 hours, was at this time centred to the N.E. of *Montclare's* position in Latitude 51° N., Longitude 32° 39′ W. At this time *Montclare* reported a fresh to strong gale from N.W. by W., and six hours later at 1800 G.M.T., when in Latitude 50° 55′ N., Longitude 32° 42′ W., reported the wind W.N.W. from storm to hurricane force accompanied by frequent squalls of terrific force, precipitous seas and long heavy swell from W.N.W.

Olympic at 1200 G.M.T. in Latitude 45° 53′ N., Longitude 37° 23′ W., reported a whole gale from W.N.W., precipitous sea and abnormal westerly swell. Six hours previous to this, when further to the westward, she had reported wind of storm force from N.W. by W.

CHART 3.—On the 27th February, 1935, at 1200 G.M.T., the depression which had caused the very heavy weather experienced by the *Montclare* and *Olympic*, had continued to move eastward.

Olympic, in Latitude 48° 14′ N., Longitude 27° 32′ W., is now situated in rear of the depression's centre and not far from *Blairgowrie's* last known position. She reports a strong breeze from W.N.W., very rough sea, and long heavy swell.

At the Board of Trade enquiry into the circumstances attending the loss at sea of the S.S. *Blairgowrie* it was found that the vessel foundered in weather of hurricane force, but that the time which elapsed between the first signal and the vessel's foundering—six and a quarter hours—seems under the circumstances so short as to indicate that causes other than the weather contributed to her loss.

Weather Chart, Noon G.M.T., February 25th, 1935.

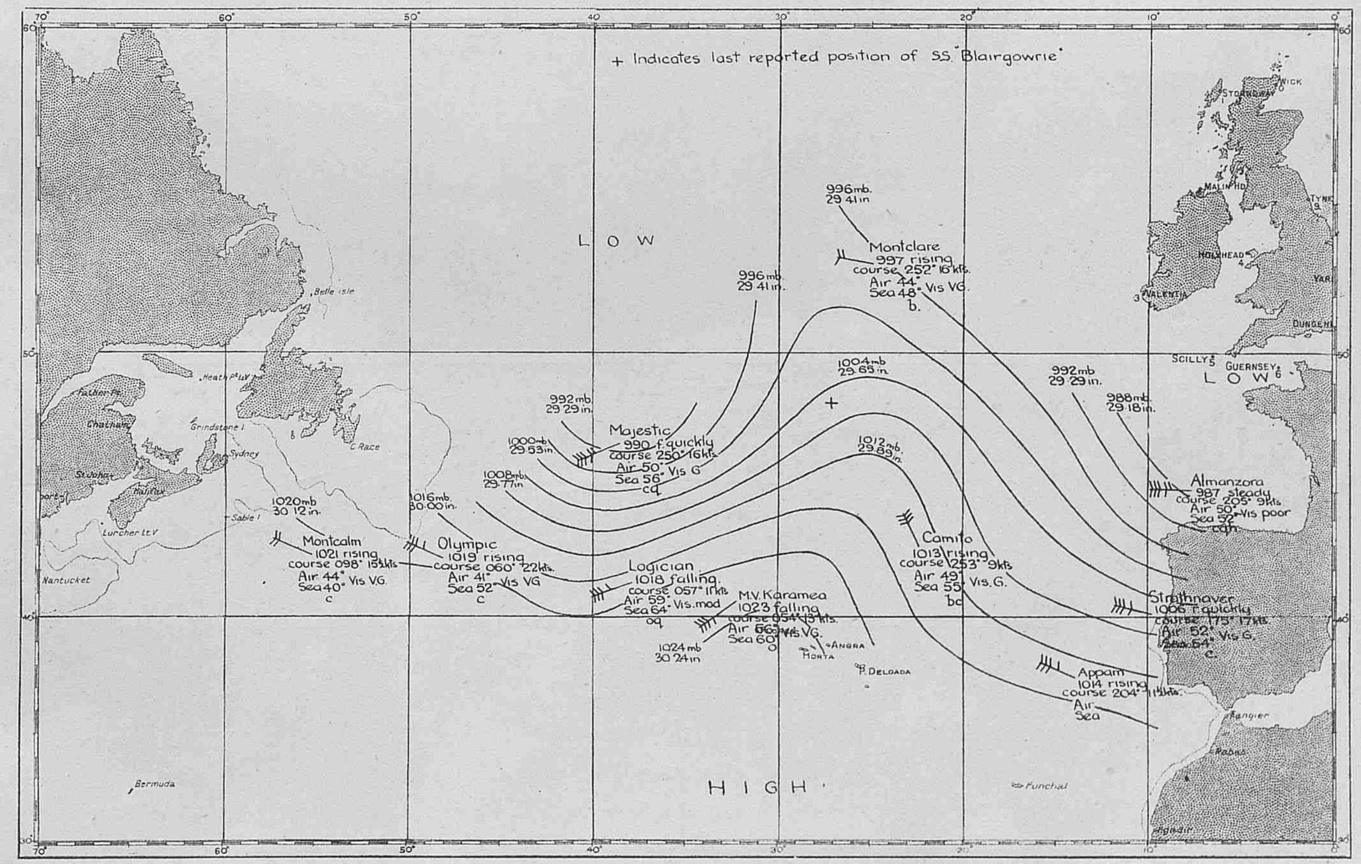

70°
60°
50°
40
30°
20°
10°
0°
60
50
40
+ Indicates last reported position of SS "Blairgowrie"
L O W
Belle isle
Heath Pt LtV
Father Pt
Chatham
Grindstone I
Sydney
C Race
St John
Halifax
Sable I
Lurcher Lt V
Nantucket
Bermuda
1020mb 30 12 in.
Montcalm
1021 rising
course 098° 15½kts
Air 44° Vis VG
Sea 40°
c
1016mb. 30.00in.
Olympic
1019 rising
course 060° 22kts.
Air 41°
Sea 52° Vis VG
c
992mb. 29.29in.
1000mb 29.53in.
1008mb. 29.77in
Majestic
990 f. quickly
course 250° 16kts
Air 50° Vis G
Sea 56°
cq
Logician
1018 falling.
course 057° 11kts
Air 59°
Sea 64° Vis. mod
oq
1024 mb 30.24in
M.V. Karamea
1023 falling
course 054° 13kts.
Air 66° Vis VG.
Sea 60°
o
Horta
Angra
P. Delgada
996mb. 29.41in.
996mb. 29.41in
Montclare
997 rising
course 252° 16kts.
Air 44°
Sea 48° Vis VG.
b.
1004mb 29.65in
+
1012mb. 29.89in.
Camito
1013 rising
course 253° 9kts
Air 49°
Sea 55° Vis. G.
bc
992mb 29.29in.
988mb. 29.18in.
Almanzora
987 steady
course 205° 9kts
Air 50°
Sea 52° Vis poor
cqh
Strathnaver
1006 f. quickly
course 175° 17kts
Air 52° Vis G.
Sea 54°
c.
Appam
1014 rising
course 204° 11½kts.
Air
Sea
Stornoway
Wick
Malin Hd
Tyne
Holyhead
Yar
Valentia
Dungeness
Scilly
Guernsey
L O W
Tangier
Rabat
Agadir
Funchal
H I G H

Chart 1.

Weather Chart, Noon G.M.T., February 26th, 1935.

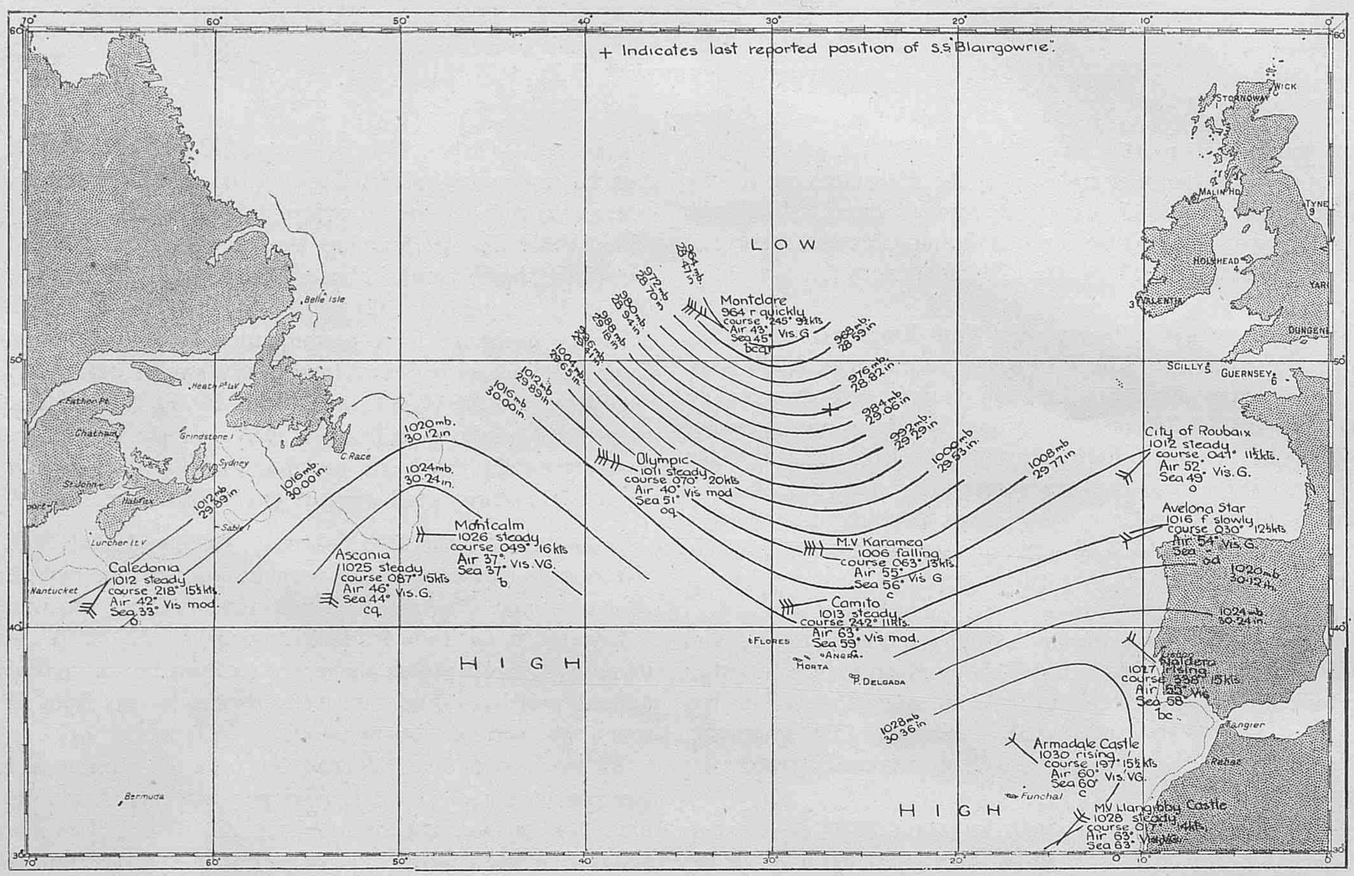

+ Indicates last reported position of S.S."Blairgowrie".
LOW
Montclare 964 r quickly course 245° 9½kts Air 43° Vis. G Sea 45° bcq
984 mb. 29.47 in
972 mb 28.70 in
980 mb 28.94 in
988 mb 29.18 in
996 mb 29.41 in
1004 mb 29.65 in
1012 mb 29.89 in
1016 mb 30.00 in
968 mb 28.59 in
976 mb 28.82 in
984 mb 29.06 in
992 mb 29.29 in
1000 mb 29.53 in
1008 mb 29.77 in
1020 mb. 30.12 in.
1024 mb. 30.24 in.
1016 mb 30.00 in.
1012 mb 29.89 in
Olympic 1011 steady course 070° 20kts Air 40° Vis mod Sea 51° oq.
Montcalm 1026 steady course 049° 16kts Air 37° Vis. VG. Sea 37° b
Ascania 1025 steady course 087° 15kts Air 46° Vis. G. Sea 44° cq.
Caledonia 1012 steady course 218° 15½kts Air 42° Vis mod. Sea 33° o
M.V Karamea 1006 falling course 063° 13kts Air 55° Vis G Sea 56° c
Camito 1013 steady course 242° 11kts. Air 63° Sea 59° Vis mod.
City of Roubaix 1012 steady course 041° 11½kts. Air 52° Vis. G. Sea 49° o
Avelona Star 1016 f slowly course 030° 12½kts Air 54° Vis. G Sea cd
1020 mb 30.12 in
1024 mb 30.24 in
Naldera 1027 rising course 358° 15kts Air 55° Vis G Sea 58° bc
1028 mb 30.36 in
Armadale Castle 1030 rising course 197° 15½kts Air 60° Vis. VG. Sea 60° c
M.V. Llangibby Castle 1028 steady course 017° 14kts Air 68° Vis. VG. Sea 63°
HIGH
HIGH
Stornoway
Wick
Malin Hd
Tyne
Holyhead
Valentia
Yar
Dungeness
Scilly
Guernsey
Belle Isle
Heath Pt
Father Pt
Chatham
Grindstone I
Sydney
C Race
St John
Halifax
Sable I
Lurcher Lt V
Nantucket
Bermuda
Flores
Angra
Horta
P. Delgada
Lisbon
Tangier
Rabat
Funchal
70°
60°
50°
40°
30°
20°
10°
0°

Chart 2.

Weather Chart, Noon G.M.T., February 27th, 1935.

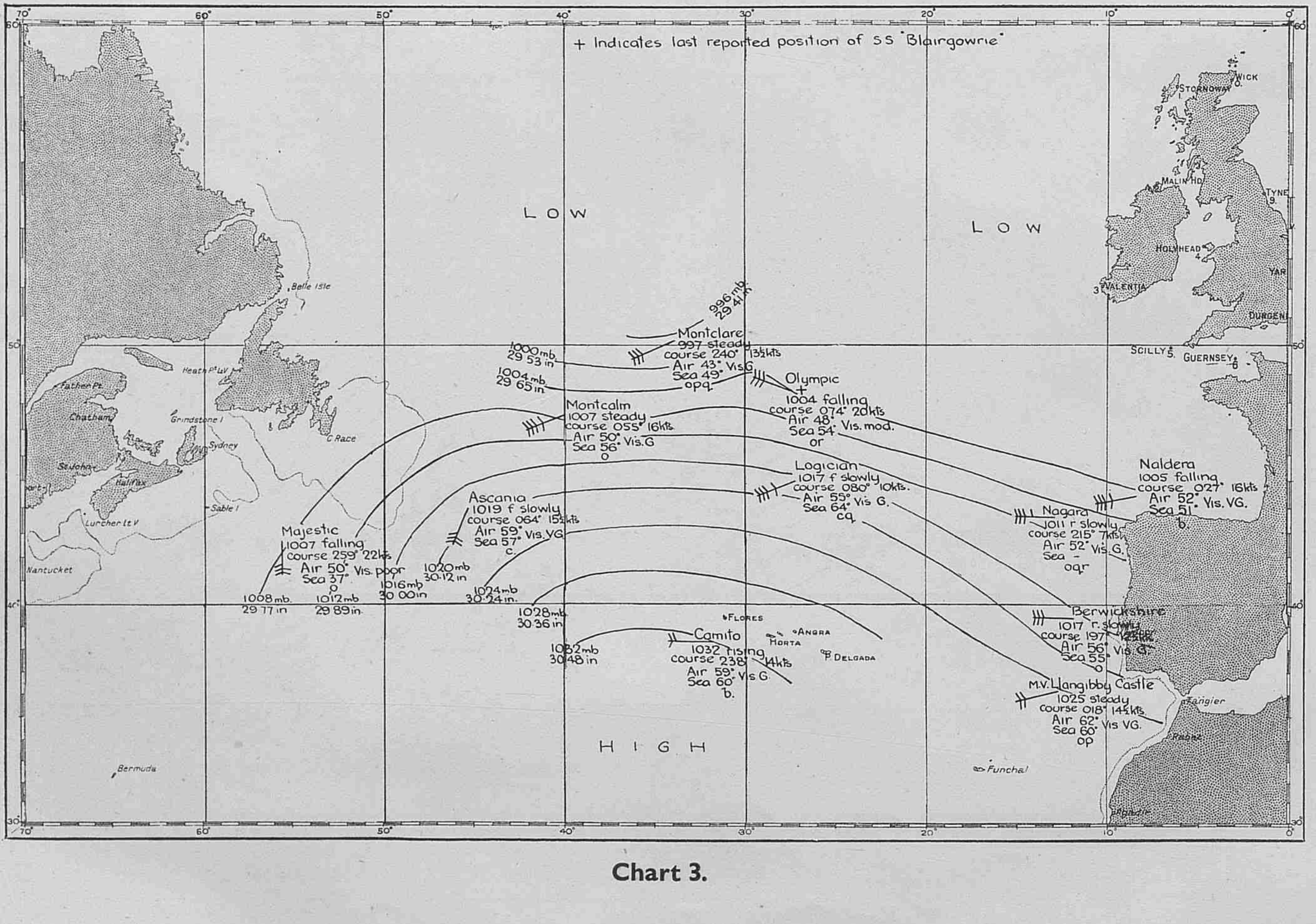

+ Indicates last reported position of S.S "Blairgowrie"
LOW
LOW
996 mb 29.41 in
Montclare 997 steady course 240° 13½kts Air 43° Vis G Sea 49° opq.
1000 mb 29.53 in
1004 mb 29.65 in
Olympic 1004 falling course 074° 20kts Air 48° Vis. mod. Sea 54° or
Montcalm 1007 steady course 055° 16kts Air 50° Vis. G Sea 56° o
Logician 1017 f slowly course 080° 10kts. Air 55° Vis G. Sea 64° cq.
Naldera 1005 falling course 027° 16kts Air 52° Vis. VG. Sea 51° b.
Nagara 1011 r slowly course 215° 7kts Air 52° Vis G. Sea - oqr
Ascania 1019 f slowly course 064° 15½kts Air 59° Vis. VG Sea 57° c
Majestic 1007 falling course 259° 22kts Air 50° Vis. poor Sea 37° p
1008 mb. 29.77 in
1012 mb 29.89 in
1016 mb 30.00 in
1020 mb 30.12 in
1024 mb 30.24 in
1028 mb 30.36 in
1032 mb 30.48 in
Camito 1032 rising course 238° 14kts Air 59° Vis G Sea 60° b.
Berwickshire 1017 r. slowly course 197° 12½kts Air 56° Vis. G. Sea 55°
M.V. Llangibby Castle 1025 steady course 018° 14½kts Air 62° Vis VG. Sea 60° op
HIGH
Stornoway
Wick
Malin Hd
Tyne
Holyhead
Valentia
Yar
Dungeness
Scilly
Guernsey
Belle Isle
Heath Pt
Father Pt
Chatham
Grindstone I
Sydney
C Race
St John
Halifax
Sable I
Lurcher Lt V
Nantucket
Bermuda
Flores
Angra
Horta
P. Delgada
Tangier
Rabat
Cadiz
Funchal
70°
60°
50°
40°
30°
20°
10°
0°

Chart 3.

SOUTHERN ICE REPORTS

During the year 1935.

January.

Year.	Day.	Position of Ice. Latitude.	Position of Ice. Longitude.	Description.	Remarks.	Name of Ship reporting.
1935	9	47° 00′ S.	26° 00′ E.	Berg ...	...	M.V. *Havsten.*
	21–24	From 60° 00′ S.	36° 30′ E.	Many bergs ...	...	Do.
		To 50° 00′ S.	28° 30′ E.			
	18	46° 05′ S.	54° 17′ E.	Berg ...	Approx. 250 feet high, 600 feet long ...	S.S. *Port Adelaide.*
		46° 20′ S.	55° 03′ E.	Berg ...	Approx. 150 feet high ...	Do.
	19	From 64° 37′ S.	62° 45′ W.	21 Bergs and several growlers ...	Mostly small and irregular ...	R.R.S. *Discovery II.*
		To 64° 16′ S.	61° 45′ W.			
		From 64° 16′ S.	61° 45′ W.	12 bergs and several growlers ...	...	Do.
		To 63° 51′ S.	61° 35′ W.			
	20	From 63° 51′ S.	61° 35′ W.	40 bergs ...	...	Do.
		To Off C. Roquemaurel				
		From Off C. Roquemaurel		12 bergs and heavy loose ice ...	Heavy loose ice was encountered near Astrolabe Is. ...	Do.
		To 63° 26′ S.	58° 37′ W.			
		From Off Astrolabe Is.		Heavy loose ice and 35 bergs ...	...	Do.
		To 63° 12′ S.	58° 38′ W.			
	21	From 62° 34′ S.	57° 51′ W.	4 bergs ...	...	Do.
		To 62° 06′ S.	56° 44′ W.			
		From 62° 06′ S.	56° 44′ W.	About 6 bergs ...	...	Do.
		To 61° 56′ S.	56° 07′ W.			
	21	61° 27′ S.	54° 36′ W.	33 bergs ...	Most of these bergs were large and tabular ...	Do.
		61° 23′ S.	53° 31′ W.	...	Approaching Clarence Is. two bergs were observed which were estimated to be about 15 miles long. Their flawless outline suggested them to be fairly recent. In recent years we have observed that most of the large ice islands varying from 10-50 miles; or even more, in length are encountered in this area.	Do.
	21	From 61° 23′ S.	53° 31′ W.	40 bergs ...	Mostly large tabular and about 5 miles long ...	Do.
		To 60° 55′ S.	52° 22′ W.			
		From 60° 55′ S.	52° 22′ W.	15 bergs ...	All tabular bergs about 100 ft. high and 1 mile long ...	Do.
		To 60° 40′ S.	51° 27′ W.			
	22	From 60° 40′ S.	51° 27′ W.	6 bergs ...	All small and irregular ...	Do.
		To 60° 15′ S.	49° 49′ W.			
		From 60° 15′ S.	49° 49′ W.	6 bergs ...	...	Do.
		To 60° 01′ S.	48° 55′ W.			
		From 59° 53′ S.	48° 01′ W.	4 bergs ...	...	Do.
		To 59° 45′ S.	46° 55′ W.			
	23	59° ?9′ S.	45° 04′ W.	1 berg ...	Irregular ...	Do.
	27	Off Cumberland Bay.		1 berg ...	Small and tabular ...	Do.
1934	Dec. 31	From 59° 59′ S.	90° 13′ E.	Numerous bergs ...	Majorly being medium to large tabular bergs ...	R.R.S. *William Scoresby.*
1935	Jan. 1,	To 60° 33′ S.	85° 07′ E.			
	1	From 60° 33′ S.	85° 07′ E.	Bergs ...	11 medium sized tabular bergs and numerous small irregular	Do.
	2	To 61° 42′ S.	84° 26′ E.			
	2	From 61° 42′ S.	84° 26′ E.	Bergs and heavy loose pack ice ...	9 small bergs and 1 large tabular (1,500′ long by 100′ high) sighted.	Do.
	3	To 61° 45′ S.	83° 26′ E.			
	3	From 61° 45′ S.	83° 26′ E.	13 bergs ...	Mostly small to medium tabular ...	Do.
	4	To 63° 35′ S.	83° 43′ E.			
	4	From 63° 35′ S.	83° 43′ E.	5 bergs, pack and drift ice ...	Bergs large to tabular ...	Do.
	6	To 63° 25′ S.	85° 43′ E.			
	7	From 63° 16′ S.	85° 48′ E.	10 bergs ...	Mostly small to medium sized tabular bergs. 1 larger estd. 1,000′ by 70′.	Do.
	8	To 63° 41′ S.	89° 04′ E.			
	8	From 63° 41′ S.	89° 04′ E.	Bergs and pack ice ...	Mainly loose heavy pack with areas of drift pieces and open water. 1 large tabular berg 2,800′ × 1,000′ × 90′ (sextant), and 15-20 medium tabular bergs sighted.	Do.
	10	To 65° 20′ S.	77° 32′ E.			
	11	From 65° 08′ S.	72° 46′ E.	5 bergs ...	Medium tabular bergs. Also pass through areas of very small scattered pieces.	Do.
		To 66° 00′ S.	65° 43′ E.			
	12	From 66° 00′ S.	65° 43′ E.	14 bergs and pack ice ...	Areas of loose pack encountered. Bergs of tabular type mainly, and about 900′ × 100′. Five of these were close together about 2 miles South of position 66° 35′ S. 61° 46′ E. 2 small irregular bergs were seen to have discolorizations.	Do.
		To 66° 43′ S.	60° 54′ E.			
	12	From 66° 43′ S.	60° 54′ E.	Pack ice and 3 bergs ...	Bergs, medium sized tabular ...	Do.
	13	To 65° 51′ S.	57° 31′ E.			
	13	From 65° 51′ S.	57° 31′ E.	7 bergs ...	Very small irregular bergs ...	Do.
	19	To 64° 57′ S.	52° 00′ E.			
	20	From 65° 23′ S.	52° 11′ E.	Pack ice ...	Pack ice sighted (180° 1 mile extending E. by N. to W. by S.)	Do.
		To 65° 04′ S.	50° 39′ E.			
	24	In 62° 43′ S.	46° 25′ E.	1 berg ...	Small irregular ...	Do.
	30	In 62° 30′ S.	49° 23′ E.	1 berg ...	Medium sized tabular ...	Do.
		In 63° 53′ S.	48° 50′ E.	1 berg ...	Medium sized irregular, about 300′ at waterline × 60′ high	Do.
	31	In 64° 53′ S.	48° 41′ E.	Brash ...	Several streams of small rotten pieces encountered ...	Do.

February.

Year.	Day.	Position of Ice. Latitude.	Position of Ice. Longitude.	Description.	Remarks.	Name of Ship reporting.
		55° 40′ S.	131° 17′ W.	Large berg snow covered, also two growlers, five miles to leeward of berg.	230 feet high, 600 feet long. Measured by sextant angles, and four point bearing.	S.S. *Port Alma.*
		55° 42′ S.	129° 27′ W.	Berg (snow covered) ... 1 growler 100°, 5 miles from berg (approx.)	250 feet high, 825 feet long. Measured by horizontal and vertical sextant angles, in conjunction with 4 point bearing.	Do.
	9	55° 54′ S.	32° 15′ W.	1 berg ...	...	R.R.S. *Discovery II.*
		From 57° 14′ S.	30° 30′ W.	5 bergs ...	...	Do.
		To 57° 31′ S.	30° 10′ W.			
		From 57° 31′ S.	30° 10′ W.	3 bergs ...	...	Do.
		To 57° 51′ S.	29° 44′ W.			
	10	58° 08′ S.	29° 21′ W.	1 berg ...	...	Do.
		From 58° 47′ S.	28° 24′ W.	9 bergs ...	...	Do.
		To 58° 58′ S.	28° 05′ W.			
		From 58° 57′ S.	28° 05′ W.	9 bergs ...	...	Do.
		To 59° 17′ S.	27° 21′ W.			
		From 59° 17′ S.	27° 21′ W.	19 bergs ...	...	Do.
		To 59° 32′ S.	27° 08′ W.			
	11	From 59° 38′ S.	26° 56′ W.	14 bergs and several growlers ...	...	Do.
		To 59° 55′ S.	26° 23′ W.			

SOUTHERN ICE REPORTS (*continued*).

Year	Day.	Position of Ice.		Description.	Remarks.	Name of Ship reporting.
		Latitude.	Longitude.			
1935	11	From 59° 55′ S. To 60° 19′ S.	26° 23′ W. 25° 37′ W.	40 bergs	Mostly small and irregular	R.R.S. *Discovery II.*
		From 60° 19′ S. To 60° 41′ S.	25° 37′ W. 24° 48′ W.	13 bergs		Do.
		From 60° 41′ S. To 61° 10′ S.	24° 48′ W. 23° 52′ W.	7 bergs		Do.
		From 61° 10′ S. To 61° 34′ S.	23° 52′ W. 22° 46′ W.	7 bergs		Do.
	12	61° 59′ S.	21° 51′ W.	Several growlers		Do.
		From 61° 59′ S. To 62° 26′ S.	21° 51′ W. 20° 53′ W.	11 bergs	Small and irregular	Do.
		From 62° 26′ S. To 62° 52′ S.	20° 53′ W. 20° 11′ W.	23 bergs	All of varying sizes and shapes...	Do.
		From 62° 52′ S. To 63° 22′ S.	20° 11′ W. 19° 21′ W.	8 bergs		Do.
		From 63° 22′ S. To 63° 51′ S.	19° 21′ W. 18° 32′ W.	150 bergs	Several of these were tabular from about ½-1 mile long	Do.
	13	From 63° 52′ S. To 64° 19′ S.	18° 29′ W. 17° 43′ W.	46 bergs	Several of these were noted for their extreme bottle green colour.	Do.
		From 64° 19′ S. To 64° 55′ S.	17° 43′ W. 16° 33′ W.	5 bergs		Do.
		From 65° 55′ S. To 65° 19′ S.	16° 33′ W. 15° 51′ W.	9 bergs		Do.
		From 65° 19′ S. To 66° 15′ S.	15° 51′ W. 13° 51′ W.	20 bergs		Do.
	14	From 66° 17′ S. To 66° 45′ S.	13° 46′ W. 12° 53′ W.	16 bergs		Do.
		From 67° 15′ S. To 67° 38′ S.	11° 47′ W. 11° 11′ W.	10 bergs		Do.
		From 67° 38′ S. To 68° 10′ S.	11° 11′ W. 10° 30′ W.	37 bergs		Do.
		From 68° 10′ S. To 68° 41′ S.	10° 31′ W. 9° 46′ W.	67 bergs and numerous growlers		Do.
	15	68° 39′ S.	9° 09′ W.	Pack ice and about 30 bergs	Heavy pack ice. This was very heavy and hummocked and trended away to the S.E.	Do.
		From 68° 11′ S. To 67° 45′ S.	7° 57′ W. 6° 48′ W.	73 bergs		Do.
		From 67° 45′ S. To 67° 24′ S.	6° 48′ W. 5° 54′ W.	60 bergs	Mostly large irregulars	Do.
		From 67° 24′ S. To 67° 01′ S. To 66° 34′ S.	5° 54′ W. 4° 46′ W. 3° 39′ W.	14 bergs		Do.
	16	From 66° 34′ S. To 66° 34′ S.	3° 39′ W. 3° 39′ W.	4 bergs		Do.
	16	From 66° 03′ S. To 65° 37′ S.	2° 32′ W. 1° 30′ W.	22 bergs		Do.
		From 65° 37′ S. To 65° 26′ S.	1° 30′ W. 1° 12′ W.	6 bergs		Do.
		From 65° 26′ S. To 64° 37′ S.	1° 12′ W. 0° 50′ E.	20 bergs		Do.
	17	From 64° 36′ S. To 65° 02′ S.	0° 50′ E. 1° 50′ E.	14 bergs		Do.
		From 65° 02′ S. To 65° 26′ S.	1° 50′ E. 2° 48′ E.	20 bergs		Do.
		From 65° 26′ S. To 65° 47′ S.	2° 48′ E. 3° 37′ E.	22 bergs		Do.
		From 65° 47′ S. To 66° 12′ S.	3° 37′ E. 4° 37′ E.	22 bergs		Do.
		From 66° 12′ S. To 66° 37′ S.	4° 37′ E. 5° 36′ E.	19 bergs		Do.
	18	From 67° 09′ S. To 67° 33′ S.	6° 38′ E. 7° 40′ E.	6 bergs	Mostly irregular bergs	Do.
		From 67° 33′ S. To 67° 54′ S.	7° 40′ E. 8° 33′ E.	5 bergs	Mostly irregular bergs	Do.
		From 68° 17′ S. To 68° 43′ S.	9° 36′ E. 10° 45′ E.	7 bergs	Mostly irregular bergs	Do.
	19	68° 43′ S.	10° 45′ E.	Heavy pack and several bergs	Heavy pack observed to South and South-east	Do.
		From 68° 46′ S. To 68° 12′ S.	11° 52′ E. 12° 44′ E.	4 bergs	From this time bergs have become fewer. It is worthy of note that the vessel about this time was slowly emerging from the Widdell sea drift and recording a W'ly set.	Do.
		From 68° 12′ S. To 67° 23′ S. To 66° 59′ S.	12° 44′ E. 14° 41′ E. 15° 45′ E.	8 bergs		Do.
	20	From 66° 35′ S. To 66° 10′ S.	16° 44′ E. 17° 47′ E.	6 bergs		Do.
		From 65° 45′ S. To 64° 56′ S.	18° 49′ E. 19° 57′ E.	8 bergs		Do.
	21	From 64° 55′ S. To 64° 30′ S.	20° 00′ E. 20° 59′ E.	3 bergs		Do.
	22	From 63° 20′ S. To 63° 52′ S.	24° 59′ E. 25° 34′ E.	3 bergs		Do.
		65° 24′ S.	27° 04′ E.	1 berg		Do.
	23	66° 20′ S.	28° 12′ E.	1 berg		Do.
		67° 21′ S.	30° 42′ E.	1 berg		Do.
	2	62° 50′ S.	40° 11′ E.	2 bergs	Very small irregular	R.R.S. *William Scoresby.*
	4	61° 46′ S.	34° 25′ E.	1 berg	Very small irregular	Do.
	5	61° 48′ S.	33° 27′ E.	2 bergs	Small irregulars	Do.
	5	62° 28′ S.	32° 02′ E.	1 berg	Large tabular	Do.
	6	62° 27′ S.	31° 12′ E.	1 berg	Medium sized tabular	Do.
	7	63° 26′ S.	29° 06′ E.	1 berg and several growlers	Berg small irregular	Do.
		From 64° 05′ S. To 64° 29′ S.	27° 48′ E. 27° 48′ E.	4 bergs	Small irregular	Do.
	8	66° 03′ S.	29° 20′ E.	Pack ice	Pack observed 180° 4 miles. Course 090°	Do.
	9	From 64° 46′ S. To 62° 25′ S.	30° 03′ E. 27° 02′ E.	10 bergs	7 small to medium irregulars, medium tabulars	Do.
	10	63° 36′ S.	25° 33′ E.	1 berg	Large tabular, distant about 10 miles, estimated length ½ mile	Do.
	11	63° 32′ S.	24° 09′ E.	3 bergs	Small irregulars	Do.
	12	From 63° 27′ S. To 63° 14′ S.	24° 06′ E. 22° 47′ E.	13 bergs	Small pinnacle	Do.
	13	63° 04′ S.	18° 45′ E.	1 berg	Small irregular, close to pack	Do.
	14	From 63° 04′ S. To 62° 59′ S.	16° 50′ E. 13° 40′ E.	14 bergs	All pinnacle or irregular, seven close to track, seven distant	Do.
	15	From 63° 11′ S. To 64° 48′ S.	12° 23′ E. 9° 04′ E.	10 bergs	6 small irregulars, the others medium tabulars	Do.
	16	From 64° 26′ S. To 63° 20′ S.	8° 12′ E. 5° 43′ E.	22 bergs	10 medium to large tabulars, the others being small or medium irregulars.	Do.

SOUTHERN ICE REPORTS (*continued*).

Year.	Day.	Position of Ice.		Description.	Remarks.	Name of Ship reporting.
		Latitude.	Longitude.			
1935	17	From 63° 06′ S. To 61° 57′ S.	5° 31′ E. 4° 22′ E.	Bergs	4 large tabulars, one of estd. length ¾ mile and one measured (sextant angles) to be 700 feet long by 180 feet high; also numerous small bergs, mostly irregular.	R.R.S. *William Scoresby.*
	18	From 61° 28′ S. To 61° 42′ S.	5° 17′ E. 7° 18′ E.	5 bergs	Small to medium irregulars, at various distances	Do.
	19	61° 41′ S.	11° 15′ E.	1 berg	Small irregular	Do.
	20	From 61° 41′ S. To 61° 30′ S.	12° 08′ E. 14° 15′ E.	12 bergs	Small to medium, mostly old worn bergs	Do.
	21	From 62° 20′ S. To 63° 10′ S.	16° 35′ E. 17° 53′ E.	Bergs	15 to 20 bergs of different types—tabular, irregular, and worn capsized—small to medium in size.	Do.
	22	From 63° 55′ S. To 64° 19′ S.	19° 28′ E. 20° 23′ E.	4 bergs	3 medium irregulars and 1 large tabular	Do.
	23	64° 44′ S.	22° 35′ E.	2 bergs	1 medium irregular, and 1 old worn capsized	Do.
	24	65° 01′ S.	22° 07′ E.	3 bergs	Small irregulars	Do.
		65° 44′ S.	22° 23′ E.	2 bergs	Small irregulars	Do.
	25	From 65° 43′ S. To 64° 15′ S.	24° 52′ E. 26° 10′ E.	9 bergs	2 very small, the others small to medium irregulars	Do.
	26	64° 29′ S.	26° 46′ E.	1 berg	Small irregular	Do.
	28	From 63° 32′ S. To 63° 19′ S.	28° 16′ E. 26° 51′ E.	3 bergs	Small irregulars	Do.

March.

1935	4	43° 15′ S.	37° 10′ E.	Large berg	...	S.S. *King William.*
	1	From 63° 38′ S. To 64° 10′ S.	24° 50′ E. 22° 56 E.	10 bergs	9 small to medium, and 1 large, irregular bergs passed	R.R.S. *William Scoresby.*
	2	From 64° 30′ S. To 64° 28′ S.	21° 01′ E. 20° 37′ E.	5 bergs	3 medium pinnacle, 1 large tabular and 1 small old tabular. Also several growlers passed.	Do.
	3	From 64° 39′ S. To 65° 14′ S.	19° 07′ E. 18° 00′ E.	5 bergs	4 small medium irregulars, 1 medium tabular	Do.
	4	From 64° 32′ S. To 64° 26′ S.	16° 25′ E. 16° 10′ E.	3 bergs	All medium sized, two being tabular and 1 irregular	Do.
	5	63° 23′ S.	13° 19′ E.	4 bergs	Irregulars, very distant	Do.
	6	From 63° 15′ S. To 63° 15′ S.	12° 16′ E. 10° 48′ E.	23 bergs	Of various sizes and types, 1 tabular measured by sextant angles to be 800 feet long by 140 feet high.	Do.
	7	63° 28′ S.	10° 02′ E.	4 bergs	Small irregulars	Do.
	8	63° 19′ S.	6° 22′ E.	3 bergs and growlers	Very small irregulars clear to track. Several growlers sighted	Do.
	9	From 63° 17′ S. To 63° 25′ S.	6° 43′ E. 3° 26′ E.	26 bergs	9 medium to large worn tabular, the others being small pinnacle or irregular.	Do.
	10	From 63° 44′ S. To 64° 15′ S.	4° 05′ E. 4° 55′ E.	10 bergs	4 medium sized tabulars (about 500 feet long by 70 feet to 80 feet high) and 6 worn irregulars. Visibility moderate.	Do.
	11	From 64° 53′ S. To 65° 08′ S.	6° 11′ E. 9° 06′ E.	12 bergs	7 medium tabulars, 5 irregulars, mostly small. Visibility occasionally poor.	Do.
	12	From 65° 04′ S. To 64° 53′ S.	9° 24′ E. 11° 00′ E.	5 bergs and growlers	3 small tabular (one estd. 200 feet by 200 feet by 150 feet high) 2 small irregulars and several growlers passed.	Do.
	13	From 64° 49′ S To 65° 41′ S.	11° 42′ E. 15° 31′ E.	7 bergs	All small, only one being of tabular type, the others worn irregular of which one was jade green in colour (65° 19′ S. 14° 45′ E.).	Do.
	14	From 67° 05′ S. To 67° 20′ S.	16° 28′ E. 14° 29′ E.	Bergs and bergy bits	Several small bergs and bergy bits passed early. Later 4 medium irregulars.	Do.
	15	From 67° 20′ S. To 67° 12′ S.	14° 29′ E. 11° 10′ E.	18 bergs	10 medium to large irregulars several being discoloured; the others small irregulars.	Do.
	16	From 67° 12′ S. To 65° 29′ S.	11° 10′ E. 5° 09′ E.	Bergs, bergy bits, and growlers	28 mediums to large, all irregulars with one exception—a tabular 1,300 feet long by 105 feet high (sextant). In addition numerous very small bergs, bergy bits, and growlers were passed. In 66° 45′ S. 7° 41′ E. two mottled green bergs were sighted distant to the Westward.	Do.
	17	From 65° 29′ S. To 63° 44′ S.	5° 09′ E. 1° 25′ E.	24 bergs	All small to medium irregulars or worn tabulars	Do.
	18	From 63° 44′ S. To 62° 26′ S.	1° 25′ E. 2° 08′ E.	18 bergs, and growlers	All small to medium irregulars. Several growlers passed	Do.
	19	From 62° 26′ S. To 61° 09′ S.	2° 08′ E. 4° 34′ E.	27 bergs, and growlers	All small to medium worn and irregular bergs. Several growlers sighted. Visibility poor or very poor.	Do.
	20	From 61° 02′ S. To 60° 14′ S.	4° 02′ E. 1° 37′ E.	43 bergs, and growlers	All small to medium worn and irregular bergs. Several growlers passed and in 60° 56′ S. 3° 09′ E. a small patch of brash was encountered. Visibility mainly very poor.	Do.
	21	From 60° 00′ S. To 58° 49′ S.	0° 57′ E. 0° 20′ E.	Bergs and growlers	Numerous bergs passed, mostly small worn, irregulars. Also several growlers. Two tabulars were estd. to be 1,200 feet by 100 feet high, and 500 feet by 100 feet high respectively. Visibility very poor throughout.	Do.
	22	56° 04′ S.	0° 20′ E.	3 bergs	2 small irregulars and 1 small tabular. Visibility good	Do.
		55° 33′ S.	0° 52′ E.	1 berg	Small irregular, close to pack	Do.
	23	55° 02′ S.	1° 24′ E.	2 bergs	Both small worn irregular bergs	Do.
		54° 31′ S.	1° 55′ E.	2 bergs	Both small irregulars, these two being the last ice sighted	Do.
	26	53° 40′ S.	111° 12′ W.	Berg	300 feet high—900 feet long	M.V. *Port Hobart.*
		53° 13′ S.	110° 31′ W.	Berg	80 feet high—160 feet long	Do.
		53° 32′ S.	106° 35′ W.	Berg	...	Do.

Reports of Ice previous to January, February and March, 1935, will be found in the Marine Observer, Volume XII, No. 117, p. 22.

MARINE METEOROLOGY AND SAFE NAVIGATION.

Extracts from Merchant Shipping (Safety and Load Line Conventions) Act, 1932. First Schedule.

International Convention for the Safety of Life at Sea, 1929.

Article 33.

Application.

The provisions of this Chapter referring to ships, unless otherwise expressly provided, apply to all ships on all voyages.

Article 34.

Danger Messages.

The master of every ship which meets with dangerous ice, a dangerous derelict, a dangerous tropical storm or any other direct danger to navigation is bound to communicate the information by all the means of communication at his disposal, to the ships in the vicinity, and also to the competent authorities at the first point of the coast with which he can communicate. It is desirable that the said information be sent in the manner set out in Regulation XLVI.*

Each Administration will take all steps which it thinks necessary to ensure that when intelligence of any of the dangers specified in the previous paragraph is received, it will be promptly brought to the knowledge of those concerned and communicated to other Administrations interested.

The transmission of messages respecting the dangers specified is free of cost to the ships concerned.

Article 35.

Meteorological Services.

The Contracting Governments undertake to encourage the collection of meteorological data by ships at sea, and to arrange for their examination, dissemination and exchange in the manner most suitable for the purpose of aiding navigation.

In particular, the Contracting Governments undertake to co-operate in carrying out, as far as practicable, the following meteorological arrangements :—

(*a*) To warn ships of gales, storms and tropical storms, both by the issue of wireless messages and by the display of appropriate signals at coastal points :

(*b*) To issue daily, by radio, weather bulletins suitable for shipping, containing data of existing weather conditions and forecasts :

(*c*) To arrange for certain selected ships to take meteorological observations at specified hours, and to transmit such observations by wireless telegraphy for the benefit of other ships and of the various official meteorological services; and to provide coast stations for the reception of the messages transmitted :

(*d*) To encourage all ship-masters to inform surrounding ships whenever they experience wind force of 10 or above on the Beaufort scale (force 8 or above on the decimal scale).

The information provided for in paragraphs (*a*) and (*b*) of this Article will be furnished in form for transmission in accordance with Article 31, sections, 1, 3 and 5, and Article 19, section 25, of the General Regulations annexed to the International Radiotelegraph Convention, Washington, 1927, and during transmission "to all stations" of meteorological information, forecasts and warnings, all ship stations must conform to the provisions of Article 31, section 2, of those General Regulations.

Weather observations from ships addressed to national meteorological services will be transmitted with the priority specified in Article 3, Additional Regulations, International Radiotelegraph Convention, Washington, 1927.

Forecasts, warnings, synoptic and other meteorological reports intended for ships shall be issued and disseminated by the national service in the best position to serve various zones and areas, in accordance with mutual arrangements made by the countries concerned.

Every endeavour will be made to obtain a uniform procedure in regard to the international meteorological services specified in this Article, and, as far as is practicable, to conform to the recommendations made by the International Meteorological Organization, to which organization the Contracting Governments may refer for study and advice any meteorological questions which may arise in carrying out the present Convention.

Article 36.

Ice Patrol. Derelicts.

The Contracting Governments undertake to continue a service of ice patrol and a service for study and observation of ice conditions in the North Atlantic. Further, they undertake to take all practicable steps to ensure the destruction or removal of derelicts in the northern part of the Atlantic Ocean east of the line drawn from Cape Sable to a point in latitude 34° N., longitude 70° W., if this destruction or removal is considered necessary at the time.

The Contracting Governments undertake to provide not more than three vessels for these three services. During the whole of the ice season they shall be employed in guarding the south-eastern, southern and south-western limits of the regions of icebergs in the vicinity of the Great Bank of Newfoundland for the purpose of informing trans-Atlantic and other passing vessels of the extent of this dangerous region; for the observation and study of ice conditions in general; for the destruction or removal of derelicts; and for the purpose of affording assistance to vessels and crews requiring aid within the limits of operation of the patrol vessels.

During the rest of the year the study and observation of ice conditions shall be maintained as advisable, and one vessel shall always be available for the search for, and destruction or removal of derelicts.

Article 37.

Ice Patrol. Management and Cost.

The Government of the United States is invited to continue the management of these services of ice patrol, study and observation of ice conditions, and derelict destruction and removal. The Contracting Governments specially interested in these services, whose names are given below, undertake to contribute to the expense of maintaining and operating these services in the following proportions :—

	Per cent.
Belgium	2
Canada	3
Denmark	2
France	6
Germany	10
Great Britain and Northern Ireland	40
Italy	6
Japan	1
Netherlands	5
Norway	3
Spain	1
Sweden	2
Union of Socialist Soviet Republics	1
United States of America	18

Each of the Contracting Governments has the right to discontinue its contribution to the expense of maintaining and operating these services after September 1st, 1932. Nevertheless, the Contracting Government which avails itself of this right will continue responsible for the expense of working up to September 1st following the date of giving notice of intention to discontinue its contribution. To take advantage of the said right it must give notice to the other Contracting Governments at least six months before the said September 1st, so that, to be free from this obligation on September 1st, 1932, it must give notice on March 1st, 1932, at the latest, and similarly for each subsequent year.

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* See page 27.

If, at any time, the United States Government should not desire to continue these services, or if one of the Contracting Governments should express a wish to relinquish responsibility for the pecuniary contribution defined above, or to have its percentage of obligation altered, the Contracting Governments shall settle the question in accordance with their mutual interests.

The Contracting Governments which contribute to the cost of the three above-mentioned services shall have the right by common consent to make from time to time such alterations in the provisions of this Article and of Article 36 as appear desirable.

Article 38.

Speed Near Ice.

When ice is reported on, or near, his course, the master of every ship at night is bound to proceed at a moderate speed or to alter his course so as to go well clear of the danger zone.

Article 39.

North Atlantic Routes.

The practice of following recognised routes across the North Atlantic in both directions has contributed to safety of life at sea, but the working of these routes should be further investigated and studied with a view to the introduction of such variations as experience may show to be necessary.

The selection of the routes and the initiation of action with regard to them is left to the responsibility of the steamship companies concerned. The Contracting Governments will assist the companies, when requested to do so, by placing at their disposal any information bearing on the routes which may be in the possession of the Governments.

The Contracting Governments undertake to impose on the companies the obligation to give public notice of the regular routes which they propose their vessels should follow, and of any changes made in these routes; they will also use their influence to induce the owners of all vessels crossing the Atlantic to follow, so far as circumstances will permit, the recognised routes, and to induce the owners of all vessels crossing the Atlantic bound to or from ports of the United States via the vicinity of the Great Bank of Newfoundland to avoid, as far as practicable, the fishing banks of Newfoundland north of Latitude 43° N. during the fishing season, and to pass outside regions known or believed to be endangered by ice.

The Administration managing the ice patrol service is requested to report to the Administration concerned any ship which is observed not to be on any regular, recognised or advertised route, or which crosses the above-mentioned fishing banks during the fishing season, or which, when proceeding to or from ports of the United States, passes through regions known or believed to be endangered by ice.

Regulation XLVI.

Transmission of Information.

The transmission of information regarding ice, derelicts, tropical storms or any other direct danger to navigation is obligatory. The form in which the information is sent is not obligatory. It may be transmitted either in plain language (preferably English) or by means of the International Code of Signals (Wireless Telegraphy Section). It should be issued **CQ** to all ships, and should also be sent to the first point of the coast to which communication can be made with a request that it be transmitted to the appropriate authority.

All messages issued under Article 34 of the present Convention will be preceded by the safety signal TTT followed by an indication of the nature of the danger, thus : TTT Ice; TTT Derelict; TTT Storm; TTT Navigation.

Information Required.

The following information is desired, the time in all cases being Greenwich Mean Time :—

(*a*) *Ice, Derelicts and other Direct Dangers to Navigation.*

(1) the kind of ice, derelict or danger observed;

(2) the position of the ice, derelict or danger when last observed;

(3) the time and date when the observation was made.

(*b*) *Tropical Storms.* (Hurricanes in the West Indies, Typhoons in the China Seas, Cyclones in Indian waters, and storms of a similar nature in other regions.)

(1) *A Statement that a Tropical Storm has been Encountered.*

This obligation should be interpreted in a broad spirit, and information transmitted whenever the master has good reason to believe that a tropical storm exists in his neighbourhood.

(2) *Meteorological Information.*

In view of the great assistance given by accurate meteorological data in fixing the position and movement of storm centres, eash shipmaster should add to his warning message as much of the following meteorological information as he finds practicable :—

(*a*) barometric pressure (millibars, inches or millimetres);

(*b*) change in barometric pressure (the change during the previous two to four hours);

(*c*) wind direction (true not magnetic);

(*d*) wind force (Beaufort or decimal scale);

(*e*) state of the sea (smooth, moderate, rough, high);

(*f*) swell (slight, medium, heavy) and the direction from which it comes.

When barometric pressure is given the word "Millibars," "inches" or "millimetres," as the case may be, should be added to the reading, and *it should always be stated whether the reading is corrected or uncorrected.*

When changes of the barometer are reported the course and speed of the ship should also be given.

All directions should be true, not magnetic.

(3) *Time and Date and Position of the Ship.*

These should be for the time and position when the meteorological observations reported were made and not when the message was prepared or despatched. The time used in all cases should be Greenwich Mean Time.

(4) *Subsequent Observations.*

When a master has reported a tropical storm it is desirable but not obligatory, that other observations be made and transmitted at intervals of three hours, so long as the ship remains under the influence of the storm.

Examples.

Ice.

TTT Ice. Large berg sighted in 4605 N., 4410 W., at 0800 G.M.T. May 15.

Derelict.

TTT Derelict. Observed derelict almost submerged in 4006 N., 1243 W., at 1630 G.M.T. April 21.

Danger to Navigation.

TTT Navigation. Alpha lightship not on station. 1800 G.M.T. January 3.

Tropical Storm.

TTT Storm. Experiencing tropical storm. Barometer corrected 994 millibars, falling rapidly. Wind N.W., force 9, heavy squalls Swell E. Course E.N.E., 5 knots. 2204 N., 11354 E. 0030 G.M.T. August 18.

TTT Storm. Appearances indicate approach of hurricane. Barometer corrected 29·64 inches falling. Wind N.E., force 8. Swell medium from N.E. Frequent rain squalls. Course 35°, 9 knots. 2200 N., 7236 W. 1300 G.M.T. September 14.

TTT Storm. Conditions indicate intense cyclone has formed. Wind S. by W., force 5. Barometer uncorrected 753 millimetres, fell 5 millimetres last three hours. Course N. 60 W., 8 knots. 1620 N., 9302 E. 0200 G.M.T. May 4.

TTT Storm. Typhoon to south-east. Wind increasing from N. and barometer falling rapidly. Position 1812 N., 12605 E. 0300 G.M.T. June 12.

WIRELESS WEATHER SIGNALS.

Under the heading "Wireless Weather Signals" it is intended to publish particulars and concise descriptions of Signals and Code used for reporting Weather, Ice and Time, in conformity with the International Convention of Safety of Life at Sea, in four sections.

I. Ships' Wireless Weather Signals.

II. Wireless Weather Signals made from the shore to ships. (Weather Bulletins and Storm Warnings.)

III. Wireless Time Signals.

IV. Wireless Ice Signals.

Sections II, III and IV will be published as far as possible in geographical order, so that the most suitable of these signals for all parts of the world may be as complete as possible in each year's Numbers of THE MARINE OBSERVER.

The International Ships' Wireless Weather Telegraphy Code, which came into force on May 1st, 1930, is given on pp. 36 to 39.

Request for information to Meteorological Services of Maritime Countries.

Invitation is hereby given to send concise descriptions of Weather Signals made for the information of shipping and seamen in all parts of the World, in accord with the International Convention of Safety of Life at Sea, 1929, with a view to publication in the appropriate number of "The Marine Observer." Only limited space is available.

REQUEST TO WEATHER SERVICES OF ALL MARITIME COUNTRIES.

In conformity with the International Convention for Safety of Life at Sea, the State Weather Services of maritime countries in all parts of the world, desiring to receive routine weather reports from British shipping, are invited to forward the names of W.T. stations appointed to receive weather reports from Selected Ships in order that the British Meteorological Office may be enabled to encourage the service specified in Article 35, clause (c) of that Convention, and so fulfil Great Britain's part in this International Contract.

The organization of British Selected Ships has now been worked up to a high state of efficiency and, where necessary, other British ships are invited to complete the desired service as far as possible. It is therefore necessary that the lists of wireless stations detailed to receive or intercept reports from British Selected Ships should be kept up to date and be as complete as possible in "The Marine Observer" so that these lists may be copied in other publications available generally to British shipping. Foreign, British Dominion and Colonial Weather Services are therefore asked—if they desire weather reports from British ships—to forward the following information :—

(1) The name of the receiving station which is appointed to work in conformity with the schedule given on page 30 for Type A.1, C.W. ships, with its call sign, latitude and longitude, similar to that given on page 32 for Portishead, except that the control system is only necessary in areas of great congestion such as the Eastern North Atlantic and North Sea.

(2) The name of the station or stations detailed to intercept or receive reports from "B" Selected Ships, working the schedule given on page 30, for Type A.2, I.C.W., and Type B ships, with call sign, latitude and longitude, similar to that given on p. 34 for Jacobs (Durban).

(3) The telegraphic address of the appropriate meteorological centre should be given in each case, together with the desired groups of the International Ships' Wireless Weather Telegraphy Code, Copenhagen, 1929.

(4) It is desirable that the stations appointed to receive reports from British Selected Ships should be well distributed, and as far as possible that one station only should be appointed to serve an area consistent with the wireless range of Selected Ships, which is up to about 1,800 miles for "A" Selected Ships, and upwards from 200 miles for "B" Selected Ships.

Attention is invited to Section (35) of the following Instructions, which has been added to meet the wishes of certain Meteorological services, expressed by their representatives at the British Empire Meteorological Conference held in London in August, 1935.

I. SHIPS' WIRELESS WEATHER SIGNALS.

WORLD-WIDE SYSTEM OF VOLUNTARY SELECTED SHIPS ROUTINE WIRELESS WEATHER TELEGRAPHY.

(1) For the purpose of aiding navigation, in accordance with Article 35, para. (*c*) of the International Convention for Safety of Life at Sea, 1929, Merchant Shipping (Safety and Load Line Conventions) Act, 1932, First Schedule (see page 26), and to assist the meteorological services of the world with weather intelligence, it is intended that there shall be an agreed number of regularly reporting ships, termed Selected Ships, of all nations, distributed over all oceans, working voluntarily under their national state meteorological institutions.

At present the number agreed upon is 1,000 of all nations.

(2) In order that this work may be fairly distributed amongst the different national merchant navies, and to prevent congestion in wireless communication, it is intended that each national meteorological service should maintain in voluntary service a number of Ships on the register of their own country as Selected Ships, in accordance with their proportion of the world's tonnage of steam and motor vessels of over 100 tons.

The following table gives the world's tonnage and the number of Selected Ships at present desired for each maritime country of the world, including those that are not yet party to the Convention of Safety of Life at Sea.

Total Merchant Tonnage approximate (Steam and Motor) of the World

(Vessels over 100 tons, Lloyd's Register Book, 1935–36)

and Number of Selected Ships required for making W.T. Weather Reports in all Oceans, World Wide.

Country.	Steamers and Motor Vessels.		Percentage of World Tonnage.	Number of Selected Ships required.	Approximate Number of Ships fitted for C.W. Long Wave Transmission (July, 1935)
	Number.	Gross Tons.			
Great Britain and Ireland.	6,998	17,298,432	28·5	285	155
Australia and New Zealand.	525	609,107	1·0	10	—
Canada (excluding Lakes).	623	863,737	1·4	14	17
Hong Kong ...	121	305,154	0·5	5	3
India and Ceylon...	159	208,241	0·3	3	1
South Africa and Other Colonies*.	574	568,332	0·9	9	5
British Empire Total.	9,000	19,853,003	32·6	326	181
America (United States)(excluding Lakes).	2,658	9,743,235	16·0	160	585
Argentine	298	316,747	0·5	5	1
Belgium	185	402,221	0·7	7	8
Brazil	293	485,995	0·8	8	12
Chile	90	142,136	0·2	2	—
China	267	454,258	0·8	8	—
Danzig	41	265,962	0·5	5	—
Denmark	694	1,098,648	1·8	18	28
Finland	302	417,890	0·7	7	—
France	1,382	2,989,386	4·9	49	16
Germany	2,070	3,693,298	6·1	61	42
Greece	589	1,711,165	2·8	28	—
Holland	1,397	2,553,776	4·2	42	22
Italy	1,041	2,838,354	4·7	47	123
Japan	2,146	4,085,650	6·7	67	253
Jugo-Slavia ...	166	346,618	0·6	6	—
Latvia	99	189,343	0·3	3	—
Norway	1,858	3,966,709	6·5	65	14
Panama	42	136,859	0·2	2	14
Portugal	183	237,840	0·4	4	13
Russia (Soviet Union).	575	1,110,811	1·8	18	10
Spain	877	1,164,271	1·9	19	12
Sweden	1,272	1,540,890	2·6	26	3
Turkey	182	199,284	0·3	3	—
Other Countries ...	659	871,885	1·4	14	9
Total ...	28,366	60,816,234	100·0	1,000	1,346

* Including Dominion of Newfoundland.

(3) Selected Ships are broadly divided into two types, " A " and " B."

" A " Selected Ships are ships fitted for long range W.T. transmission (Type A.1, C.W. apparatus) mostly mail steamers sailing and arriving at dates fixed by advertised programmes.

" B " Selected Ships are ships fitted for comparatively short range W.T. transmission (Type A.2, I.C.W. apparatus), including passenger and cargo liners sailing according to an advertised programme, as well as a number of vessels whose movements are not advertised and may vary from voyage to voyage.

(4) It is necessary that observations reported by wireless telegraphy should synchronize. The International times of observation for weather telegraphy at sea are 0000, 0600, 1200 and 1800 hours G.M.T.

(5) It is necessary that weather reports made for the information of all ships and the meteorological services of the different countries should be in one code, simple and concise, giving only essential information.

Selected Ships use the International Ships' Wireless Weather Telegraphy Code, 1929.

British Selected Ships.

(6) When British ships become regular voluntary observing ships to the Meteorological Office, London, their Commanders volunteer to carry out the duties of Selected Ships when required.

The names of all British observing ships are published in a fleet list at the end of THE MARINE OBSERVER, corrected monthly by supplement.

(7) Selected Ships are selected from this list, according to their sailing schedules and trades to provide distribution, according to their wireless apparatus to ensure efficient communication, and according to the capacity and keenness of their officers to ensure the most accurate information.

(8) When observing ships are detailed as Selected Ships, their commanders are specially notified; and each Selected Ship is identified by a number placed before her name in the fleet list, with symbols indicating the nature of her wireless telegraphic apparatus.

(9) There are (Oct. 1st, 1935), 3,608 British ships fitted with wireless telegraphy. The proportion fitted with Type A.1 is about 1 to every 17 fitted with Type A.2 or Type B apparatus.

Of the total of 3,608 British ships fitted with W/T.—

155 are fitted for sending Long Wave, C.W.
183 ,, ,, ,, Short Wave, C.W.

Nearly all British ships carrying W/T are capable of receiving on long-wave, whereas far fewer can receive on short wave.

(10) A fairly long range with reliability being desirable, at present long wave, C.W., is the most satisfactory, and British " A " Selected Ships are at present confined to ships so fitted.

Times of Observation.

(11) The following Chart indicates the zones for which the International watch-keeping periods are fixed for wireless operators, all four times of meteorological observation being indicated in each zone.

(12) Many Selected Ships only have one officer in each watch. The first essential for safe navigation is a good lookout kept by the officer of the watch, as well as the lookout man. The officer of the watch is responsible for meteorological observation, and the accuracy of reports. If the officer of the watch at night goes into the lighted chart house to read meteorological instruments and record them, not only does he leave his post of lookout, but he returns to the bridge momentarily blinded.

(13) Wireless meteorological reports are not asked for in British Selected Ships during the hours of darkness in which there is only one officer in each watch.

The times of observation which are starred on the chart are those which generally fall during daylight in the different zones, and at these times all British Selected Ships are requested to record observations for reporting by wireless.

(14) In certain parts of the world " A " Selected Ships having two officers in each watch are requested to record observations at all four times, and report them to certain meteorological services.

Communication.

(15) In order that communication may be effective (that is, that the reports may reach as many ships as possible as well as the appropriate meteorological centres), British Selected Ships work a time schedule for transmitting their reports and use prescribed wave lengths both when addressing specified stations or all ships.

(16) Generally " A " Selected Ships address their reports to specified meteorological centres, making them to specified coast stations, so that they may be intercepted by all ships within range. In parts of the world where coast stations are not detailed to receive routine reports from " A " Selected Ships they broadcast their reports to **C.Q.** (all ships).

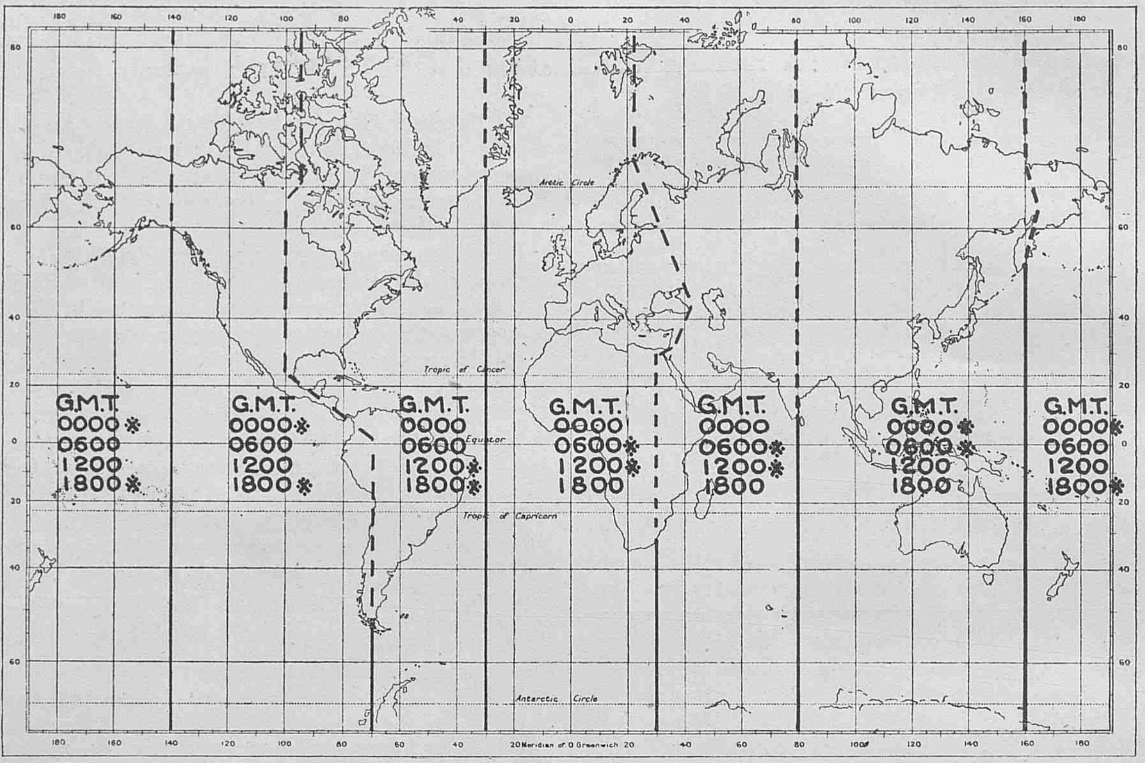
(17) The reports of " B " Selected Ships are primarily intended in all parts of the world for the information of all ships.

Generally " B " Selected Ships address and make their reports to **C.Q.** (all ships) so that they may be intercepted by shore stations within range as well as by other ships.

In parts of the world where there may be insufficient " A " Selected Ships, " B " Selected Ships are requested to address their reports to meteorological centres, making them to coast stations.

International Observation Times for Weather Telegraphy at Sea.

* Indicates usually daylight.



(18) Great importance is attached to the S.O.S. periods of silence. Therefore the times of transmission for " A " Selected Ships are fixed to commence immediately at the end of the appropriate S.O.S. silence period.

This allows a sufficient interval from the time of observation for recording and coding the observations carefully and sending the coded messages from the bridge to the wireless house.

(19) Usually the times of commencement of transmission for " A " and " B " Selected Ships are fixed at 18 minutes and 30 minutes respectively after observation time; but for ships with only one W.T. operator in certain zones, special commencing periods are fixed to accord with wireless watch.

(20) The schedule which follows indicates the times of observation and commencement of times of transmission for both " A " and " B " Selected Ships in the different zones.

Schedule.
All times are G.M.T.

Zones between Greenwich Meridians.	FIRST WEATHER REPORT.			SECOND WEATHER REPORT.		
	Times of observations.	Times of reporting by Type A1 (C.W.) Ships.	Times of broadcasting by Type A2 (I.C.W.) and Type B (Spark) Ships.	Times of observations.	Times of reporting by Type A1 (C.W.) Ships.	Times of broadcasting by Type A2 (I.C.W.) and Type B (Spark) Ships.
30° W.–30° E.	0600	0618 0818	0830	1200	1218	1230
30° E.–80° E.	0600	0618 0818	0630 0830	1200	1218	1230
80° E.–160° E.	0000	0018	0030	0600	0618 0818	0830
160° E.–140° W.	0000	0018	0030	1800	1818 2018	2030
140° W.–70° W.	0000	0018	0030	1800	1818 2018	1830 2030
70° W.–30° W.	1200	1218	1230	1800	1818 2018	2030

It will be noted that against some of the observation times there are two times of commencement of periods for transmitting. The second of these times, where two occur, are for single operator ships to report, in cases where they would not be keeping wireless watch following the observation hour. It should be remembered that a large proportion of " Selected Ships " carry two or three operators, and they should use the earlier periods for transmission, also repeating for the benefit of ships with one operator during the second period.

In working this schedule, Selected Ships should be careful not to jam each other.

It may be advantageous for " B " Selected Ships generally—and for " A " Selected Ships beyond the region of the Eastern North Atlantic, regulated by Roll Call, and when not reporting to a shore station—when in W/T communication previous to reporting time to arrange the order in which they will transmit their weather reports to **C.Q.** at the next scheduled time.

(21) For " A " Selected Ships the wave length to be used in reporting to shore stations is specified in a list of stations detailed to receive coded weather reports from " A " Selected Ships, published in the latest number of THE MARINE OBSERVER. In the Eastern North Atlantic, where there is great congestion of wireless traffic, British " A " Selected Ships work in accordance with a roll call for the day, broadcast from the specified W/T station for the information of all shipping, particulars of which are given in the detailed list of wireless stations above mentioned.

In parts of the world where there are not stations detailed to receive reports from " A " Selected Ships, they make their reports to **C.Q.** on 2100 metres.

(22) " B " Selected Ships use 600 metres wave length throughout the service in all parts of the world.

The names of stations detailed to intercept or receive weather reports from " B " Selected Ships are given in a list following that for " A " Selected Ships in the latest number of THE MARINE OBSERVER.

(23) The Chart of the World accompanying the lists of wireless stations detailed to receive or intercept reports from British Selected Ships, at the end of THE MARINE OBSERVER is revised and kept up to date quarterly. It is intended to illustrate the foregoing description by indicating graphically the stations and their approximate range, or the limits of the areas for which they should be used by British Selected Ships, and for which the details are given in the aforementioned lists.

(24) In order that all ships should know when Selected Ships make their reports, and be able to decode them, a pamphlet M.O. 9,32 entitled Decode for use with the International Code for Wireless Weather Messages from Ships has been published since May, 1930. This has been placed on board British ships by their owners, and the schedule of communication is now so well known throughout the sea service that jamming and confusion have been much reduced.

All are asked to help in making this voluntary scheme a success.

(25) No communication charges are made to the ship for Selected Ships' routine wireless weather reports broadcast to all ships, or addressed to meteorological centres specified in the lists in the last number of The Marine Observer. Wireless weather reports addressed by ships to meteorological centres not conforming to these instructions may be liable to charges.

(26) The number of messages required for this service is comparatively small, when effectively organized.

Relaying on wave lengths specified in (21), (22), and in the lists of stations in The Marine Observer (that is to say, wave lengths used for Selected Ship weather reporting) should not be resorted to.

Every endeavour should be made for the reports in areas in which International W/T link or collective ships, such as the French S.S. *Cuba*, are working, to reach those ships, who will relay them to special shore stations for the information of meteorological centres on a special short wave (long range).

The main object of this system is to make one transmission serve as many ships as possible and the appropriate meteorological centre with the information reported.

(27) While there is congestion in the Eastern North Atlantic and Selected Ships are indicated by roll call to report, in other parts of the world there may often be insufficient Selected Ships to provide an adequate service of routine reports.

In the regions of heavy weather on the less frequented routes of the Southern Ocean, and particularly in the Hurricane regions during the Hurricane season, British ships other than Selected Ships are asked to assist in this service.

This will be dealt with in (34).

Observation and Coding.

(28) Guidance in observing and recording meteorological elements will be found in the Marine Observer's Handbook, Fifth Edition.

(29) The code, and guidance for its use are given on pages 36 to 39. For working purposes a glazed code card Form 138A with Code Tables and schedule for communication is supplied to the commanders of Selected Ships.

Brief Instructions for the Guidance of British Selected Ships.

(30) The work of "A" and "B" Selected Ships is largely interdependent.

It is essential that observing officers should be conversant with communication as well as being skilled in observation, and the application of the meteorological information; and that wireless operators should be conversant with the general purpose and application of the information communicated as well as skilled in this system of communication.

It is therefore essential that all concerned should be familiar with the whole scheme.

The following brief instructions are intended to assist the Commanders of Selected Ships in regulating the work under their command.

All Selected Ships.

(31) **Observing Officers.**—At the times indicated for observation on the chart, see (13) and (14), carefully enter your observations in the record of synchronized observations, Form 911 or 916.

Code these observations on to the Register, Form 138.

If the message is to be broadcast to **C.Q.** the weather information may be conveniently abbreviated to the four universal groups of figures; and instead of using supplementary groups, information of Ice or Set and Drift of current may be given briefly in plain language.

If the message is to be sent to a meteorological centre, ascertain from the list in the latest Marine Observer what groups are desired, and make out the message accordingly.

Write out the message on Form 139 and address carefully to **C.Q. Weather** or the specified meteorological centre for the part of the world given in the lists in the latest number of The Marine Observer. Send it to the wireless operator just before the commencement of the S.O.S. period following the observation time.

Example. For Meteorological centre.—From **GMLJ** to **GKU** Weather London 20506, 13106, 18603, 88660, 35x08, 54528, 65825.

Example. For all ships.—C.Q. Weather 13167, 55106, 00000, 16979. Current from 15N. 52E. to 16N. 54E. 58 degrees one knot Dalgoma.

"A" Selected Ships.

(32) **Wireless Operator.**—Consult the list of stations detailed to receive reports in The Marine Observer.

In the Eastern North Atlantic, when on the roll call transmit the weather report to **GKU.** accordingly on the appointed wave length, following the order of the roll call at the schedule time. The reports for 0000 and 1800 hours G.M.T. should be made as soon as convenient after the silence period.

In parts of the world where the message is addressed to a meteorological centre call the station detailed in The Marine Observer at schedule time, see (20), and on the wave length specified, and transmit the report, which will be acknowledged in the ordinary way, remembering that this message is intended for ships within range as well as the shore station.

The message will be addressed to **C.Q.** in parts of the world where there is no station detailed in The Marine Observer. Send it out at schedule time on 2100 metres.

Make your transmissions as above with due consideration to circumstances.

"B" Selected Ships.

(33) **Wireless Operator.**—If the message is addressed **C.Q.,** broadcast it at or following schedule time given in (20) on 600 metres. When in range of stations indicated in the list given in The Marine Observer as detailed to intercept wireless weather reports, the message may be intercepted.

If the message is addressed to a meteorological centre, call the appropriate station indicated in The Marine Observer and transmit the message to that station in the usual way.

As far as possible, reports from "B" Selected Ships addressed to a meteorological centre should be made at schedule times, so that they may be intercepted by all ships within range.

If for local reasons these reports addressed to meteorological centres are not made at schedule times and on 600 metres wave length, they should be made also in accordance with schedule to all ships.

Ships' Wireless Weather Reports in Parts of the World where there are not sufficient Selected Ships to provide an adequate Service.

(34) Under Article 34 of the Convention for Safety of Life at Sea, the master of every ship meeting a dangerous tropical storm, is bound by law to report to ships in the vicinity, and to the first point of the coast with which he can communicate (see page 28), but routine wireless weather reporting is **voluntary.**

It is desirable that ships and meteorological centres should as far as possible have routine wireless weather reports in fine as well as in bad weather, so that they may be forewarned.

In any part of the world in the open ocean where and when there are not sufficient Selected Ships to provide an adequate service, and particularly in the Southern Ocean and the regions of tropical revolving storms, British ships which are not Selected Ships are asked to assist in this service.

As far as possible the International Ships' Wireless Weather Telegraphy Code should be used and the procedure for Selected Ships should be carried out. British ships which are not Selected Ships should only make routine wireless weather reports to the shore through stations which have been detailed to receive weather reports without charge to the ship. Such stations are notified in the lists before mentioned in The Marine Observer, and these lists are copied in the Admiralty list of Wireless Signals. and are kept up to date by Admiralty Notices to Mariners.

The masters of all British ships are advised to procure the pamphlet, M.O.329, Decode for use with the International Code for Wireless Weather Messages from Ships, published and sold by H.M. Stationery Office, through any bookseller, price 6d.

Additional Local Reports.

(35) If for local reasons, British ships are asked locally to report weather at times other than those of the routine times for British Selected Ships, they are requested to do so if convenient; but British Selected Ships, and British ships carrying on the service where there are not Selected Ships, should in such cases also report at the routine times laid down, so that there may always be a service of routine weather reports made at schedule times for the benefit of navigation.

In certain Dominions and Colonies of the British Empire, where for local reasons observations are desired to be reported additional to those specified in the schedule on page 32 by ships at sea to meteorological centres ashore, Notices to Mariners, specifying a special time of observation, will be published through the appropriate Dominion or Colonial nautical authority.

These reports should be made in the International Ships' Wireless Weather Telegraphy Code.

The observations need not be recorded in the Forms supplied to British Selected Ships, for the return of observations to the Marine Division of the British Meteorological Office, for the purpose of world-wide weather investigation. Records of synchronized observations made at the four International times given in Sections (4), (11) and (20) are sufficient for this purpose.

WIRELESS STATIONS DETAILED TO RECEIVE ROUTINE CODED WEATHER REPORTS FROM "A SELECTED SHIPS."

Request for Information.

THE ATTENTION OF METEOROLOGICAL SERVICES IS DIRECTED TO THE INVITATION GIVEN ON PAGE 28 OF THIS NUMBER.

Ocean.	Station.	Position.	Call Sign.	Frequency and Wave Length.		Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
				For Station to call up "Selected Ships."	For "Selected Ships" to report to Station.				
North Atlantic and North Sea.	Portishead.	Lat. 51° 28′ 41″ N. Long. 2° 47′ 30″ W.	**GKU.**	149 kc/s. (2013 metres).	143 kc/s. (2100 metres).	North Sea and Eastern North Atlantic East of Longitude 40° W. but not within 300 miles of station. (*see* Chart of the World.)	Weather London.	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	Control system. "Selected Ships" chosen to report in given order notified by station daily at 2300, 0330, and 1030 G.M.T. Roll call thus—Weather London—call sign of chosen "Selected Ships" to report through GKU at schedule times on 2100 m.
North Atlantic.	Horta, Azores.	Lat. 38° 32′ N. Long. 28° 38′ W.	**CTG.**	125 kc/s. (2400 metres).	125 kc/s (2400 metres).	Those "A" Selected Ships not in the Roll Call for reporting to Weather London through Portishead, in the Eastern North Atlantic, east of Long. 40°W. should report to this station.	Radio Horta.	Weather only, up to seven groups, preferable No. 3 Supplementary Groups.	"A" Selected Ships in the Eastern North Atlantic not on the roll call made through Portishead (described in these notes for Portishead) should report to Horta in accordance with schedule given in the instructions for British "A" Selected Ships.
	Chatham Mass.	Lat. 41° 43′ N. Long. 70° 47′ W.	**WCC.**		142·9kc/s. (2098 metres).	North Atlantic West of Longitude 40° W.	Observer Washington	Weather only. First four groups of observations taken at 0000 and 1200 G.M.T. only required.	No control. All British "A Selected Ships" within area to address their 0000 and 1200 G.M.T. observations to Observer Washington and their 1800 G.M.T. observations to CQ in accordance with schedule.
	Sayville N.Y.	Lat. 40° 45′ N. Long. 73° 06′ W.	**WSL.**						
	Thomaston.	Lat. 44° 01′ N. Long. 69° 13′ W.	**WAG.**						
	Jupiter.	Lat. 26° 42′ N. Long. 80° 02′ W.	**WMR.**						
	Palm Beach.	Lat. 26° 42′ N. Long. 80° 02′ W.	**WOE.**						
Mediterranean and Red Sea.									
South Atlantic.	Slangkop (Cape Town)	Lat. 34° 08′ 46″ S. Long. 18° 19′ 18″E.	**ZSC**	—	143 kc/s. (2100 metres).	South Atlantic Westward of 25° E. and within a range of about 2,000 miles of station.	Met.	Weather only. Four universal groups and first group of No. 6 Supplementary groups.	No control. Only 0600 G.M.T. observation required. All British "A Selected Ships" within area should report, commencing at 0618 G.M.T.

WIRELESS STATIONS DETAILED TO RECEIVE ROUTINE CODED WEATHER REPORTS FROM "A SELECTED SHIPS."

(*Continued.*)

Ocean.	Station.	Position.	Call Sign.	Frequency and Wave Length.		Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
				For Station to call up "Selected Ships."	For "Selected Ships" to report to Station.				
Indian Ocean.	Jacobs (Durban).	Lat. 29° 55′ 40″ S. Long. 30° 58′ 50″E.	**ZSD**	—	143 kc/s. (2100 metres).	Indian Ocean S. of 20° S. and Eastward of 25° E. and within a range of about 2,000 miles of station.	Met.	Weather only. Four universal groups and first group of No. 6 Supplementary groups.	No control. Only 0600 G.M.T. observations required. All British "A Selected Ships" within area should report, commencing at 0618 G.M.T.
	Bombay.	Lat. 19° 04′ 55″ N. Long. 72° 49′ 54″E.	**VWB**	—	143 kc/s. (2100 metres).	Arabian Sea N. of line C. Comorin to Ras Fartak.	Weather.	Weather only. No. 6 Supplementary groups.	All British "A Selected Ships" are requested, when convenient, to report 0000 G.M.T. observations commencing at 0018 G.M.T. in addition to schedule times.
	Madras.	Lat. 12° 59′ 17″ N. Long. 80° 10′ 56″E.	**VWM**	—	143 kc/s. (2100 metres).	Bay of Bengal N. of line C. Comorin to Achin Head.	Weather.	Weather only. No. 6 Supplementary groups.	All British "A Selected Ships" are requested, when convenient, to report 1200 G.M.T. observations commencing at 1218 G.M.T. in addition to schedule times.
	Colombo.	Lat. 6° 55′ 14″ N. Long. 79° 52′ 46″E.	**VPB**	130 kc/s. (2300 metres).	143 kc/s. (2100 metres).	Indian Ocean South of a line Ras Fartak, C. Comorin and Achin Head, and within a range of about 1500 miles.	Weather.	Weather only. No. 6 Supplementary groups preferred.	No control—all British "A Selected Ships" within area should report in accordance with Schedule.
	Mombasa.	Lat. 4° 03′ 11″ S. Long. 39° 39′ 49″E.	**VPQ**	—	125 kc/s. (2400 metres).	From Ras Hafun to Lat. 20° S. when westward of the Colombo area.	Weather Nairobi.	Weather only. No. 6 Supplementary groups.	No control—all British "A Selected Ships" within area should report 0600 G.M.T. observations.
	Perth.	Lat. 32° 01′ 51″ S. Long.115° 49′31″E.	**VIP**	125 kc/s. (2400 metres).	143 kc/s. (2100 metres).	Indian Ocean and Southern Ocean between Long. 90° and 135° E.; but not within 100 miles of the coast.	Weather.	Weather only. No. 6 Supplementary groups.	No control—all British "A Selected Ships" within area should report in accordance with Schedule. Reports not required for observation times not starred on Chart, p. 30, of the January 1936 number.
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12′ 39″ N. Long.114°15′11″E.	**VPS.**	8330kc/s. (36 metres) or 500 kc/s. (600 metres).	143kc/s.* (2100 metres).	China Sea and North Pacific to about 1,500 miles from station.	Royal Observatory.	Weather only, preferably No. 6 Supplementary Groups.	No control—all British "A Selected Ships" within area should report in accordance with Schedule. *Alternatively see particulars on p. 35 and use wave length and times for "B Selected Ships."
South Pacific.	Sydney.	Lat. 33° 46′ 00″ S. Long.151° 03′09″E.	**VIS**	125 kc/s. (2400 metres).	143 kc/s. (2100 metres).	S. Pacific Coral and Tasman Seas and Southern Ocean between Long. 135° and 160° E.; but not within 100 miles of the coast.	Weather.	Weather only. No. 6 Supplementary groups.	No control—all British "A Selected Ships" within area should report in accordance with Schedule. Reports not required for observation times not starred on Chart, p. 30, of the January 1936 number.
	New Zealand.	—	—	—	—	—	Weather Wellington.	Weather only, four universal groups.	The Meteorological Office. Wellington, will be glad to receive routine reports from British Selected Ships within range of New Zealand W/T Stations through the normal commercial channels.

WIRELESS STATIONS DETAILED TO INTERCEPT ROUTINE CODED WEATHER REPORTS FROM "B SELECTED SHIPS."

In cases where routine weather reports made to CQ might not be received by the appropriate station within range, indicated in this list, they should be made to that station by call sign, but so that they may be readily intercepted by all ships. 600 m. is used throughout.

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
North Atlantic.						
South Atlantic.	Salinas	Lat. 0° 37′ 00″ S. Long. 47° 23′ 00″ W.	**PPL.**	Meteoro Rio.	Weather only, including supplementary groups.	
	S. Luiz	Lat. 2° 31′ 28″ S. Long. 44° 16′ 30″ W.	**PXM.**			
	Fortaleza	Lat. 3° 42′ 49″ S. Long. 38° 30′ 56″ W.	**PPC.**			
	Natal	Lat. 5° 46′ 30″ S. Long. 35° 16′ 20″ W.	**PXN.**			
	Olinda	Lat. 8° 00′ 55″ S. Long. 34° 50′ 40″ W.	**PPO.**			
	Amaralina	Lat. 13° 00′ 50″ S. Long. 38° 28′ 27″ W.	**PPA.**			
	Abrolhos	Lat. 17° 57′ 35″ S. Long. 38° 42′ 00″ W.	**PXH.**			
	Victoria	Lat. 20° 18′ 52″ S. Long. 40° 19′ 06″ W.	**PPT.**			
	Rio	Lat. 22° 59′ 19″ S. Long. 43° 11′ 26″ W.	**PPR.**			
	Santos	Lat. 23° 59′ 22″ S. Long. 46° 18′ 18″ W.	**PPS.**			
	Florianopolis	Lat. 27° 35′ 22″ S. Long. 48° 34′ 17″ W.	**PPF.**			
	Juncçao	Lat. 32° 03′ 22″ S. Long. 52° 08′ 13″ W.	**PPJ.**			
Indian Ocean.	Jacobs (Durban).	Lat. 29° 55′ 40″ S. Long. 30° 58′ 50″ E.	**ZSD**	Met.	Weather only, 4 universal groups and first group of No. 6 Supplementary groups.	
	Algoa Bay (Port Elizabeth).	Lat. 33° 57′ 16″ S. Long. 25° 35′ 30″ E.	**ZSQ**	Met.	Weather only, 4 universal groups and first group of No. 6 Supplementary groups.	
	Calcutta.	Lat. 22° 33′ 31″ N. Long. 88° 20′ 16″ E.	**VWC.**	Weather.	Weather only up to 6 groups, No. 6 Supplementary Groups preferred.	
	Rangoon.	Lat. 16° 45′ 57″ N. Long. 96° 11′ 51″ E.	**VTR.**			
	Madras.	Lat. 12° 59′ 17″ N. Long. 80° 10′ 56″ E.	**VWM.**			
	Bombay.	Lat. 19° 04′ 55″ N. Long. 72° 49′ 54″ E.	**VWB.**			
	Karachi.	Lat. 24° 51′ 05″ N. Long. 67° 02′ 32″ E.	**VWK.**			
	Matara.	Lat. 6° 01′ 07″ N. Long. 80° 35′ 39″ E.	**GZP.**			
	Mombasa.	Lat. 4° 03′ 11″ S. Long. 39° 39′ 49″ E.	**VPQ**	Weather Nairobi.		
	Dar-es-Salaam.	Lat. 6° 50′ 38″ S. Long. 39° 17′ 24″ E.	**ZBZ**	Weather Nairobi.		
	Mauritius.	Lat. 20° 23′ 41″ S. Long. 57° 35′ 25″ E.	**VRS.**	Observatory Mauritius.	Weather 4 universal groups and first of No. 6 Supplementary Groups.	
	Geraldton.	Lat. 28° 47′ 15″ S. Long. 114° 36′ 24″ E.	**VIN**	Weather.	Weather only, including No. 6 Supplementary Groups.	
	Esperance.	Lat. 33° 52′ 40″ S. Long. 121° 53′ 34″ E.	**VIE**			

WIRELESS STATIONS DETAILED TO INTERCEPT ROUTINE CODED WEATHER REPORTS FROM "B SELECTED SHIPS."

(*Continued.*)

In cases where routine weather reports made to CQ might not be received by the appropriate station within range, indicated in this list, they should be made to that station by call sign, but so that they may be readily intercepted by all ships. 600 m. is used throughout.

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12′ 39″ N. Long. 114° 15′ 11″ E.	**VPS.**	Royal Observatory.	Weather only, preferably No. 6 Supplementary Groups.	
South Pacific.	Auckland.	Lat. 36° 50′ 37″ S. Long. 174° 46′ 08″ E.	**ZLD.**	Weather Wellington.	Weather only, four universal groups.	The Meteorological Office, Wellington, will be glad to receive routine reports from British Selected Ships within range of New Zealand W/T Stations through the normal commercial channels.
	Wellington.	Lat. 41° 16′ 26″ S. Long. 174° 45′ 55″ E.	**ZLW.**			
	Awarua.	Lat. 46° 30′ 47″ S. Long. 168° 22′ 24″ E.	**ZLB.**			
	Chatham Island.	Lat. 43° 57′ 28″ S. Long. 176° 34′ 25″ W.	**ZLC.**			
	Rarotonga.	Lat. 21° 11′ 52″ S. Long. 159° 48′ 52″ W.	**ZKR.**			
	Apia.	Lat. 13° 50′ 17″ S. Long. 171° 49′ 42″ W.	**ZMA.**			
	Thursday I.	Lat. 10° 35′ 14″ S. Long. 142° 12′ 43″ E.	**VII**	Weather.	Weather only, including No. 6 Supplementary Groups.	
	Townsville.	Lat. 19° 16′ 09″ S. Long. 146° 49′ 47″ E.	**VIT**			
	Brisbane.	Lat. 27° 25′ 34″ S. Long. 153° 07′ 19″ E.	**VIB**			
	Melbourne.	Lat. 37° 46′ 56″ S. Long. 144° 52′ 09″ E.	**VIM**			
	Adelaide.	Lat. 34° 51′ 14″ S. Long. 138° 31′ 55″ E.	**VIA**			

INTERNATIONAL SHIPS' WIRELESS WEATHER TELEGRAPHY CODE.

Adopted by the International Meteorological Organization at Copenhagen, September, 1929.

Code and Instructions for Coding Messages.

The International Ships' Wireless Weather Code is a figure code, arranged in groups of five figures.

The first four groups are universal and the remaining groups are in two alternative or supplementary sets of groups. The first figure in the fifth group of message (or first supplementary group) indicates which set of supplementary groups is used.

The first four universal groups should always be used, and the supplementary sets of groups may be omitted, or abbreviated by omitting the last group or groups of the set; that is, the code figure message may be shortened as necessary, but the order of the figures and groups must always be strictly maintained, otherwise the message is not decodable.

If an observation or element is not available, an X (or the appropriate number of Xs) (▬ ● ● ▬) should take its place in order to maintain the sequence of figures in the groups.

Having entered synchronized weather observations and particulars of set and drift of current and ice in the Ship's Meteorological Record, Form 911, or the Meteorological Log, Form 915 (specially ruled pages at end of book), the observations should be coded, thus—

First. From the list of wireless stations detailed to receive routine coded weather reports from "Selected Ships," ascertain the number of groups and the supplementary groups desired by the shore meteorological services from ships in the part of the world that the ship is in, remembering that the seventh group can only be given completely by ships having a special barograph; and decide on the information to be sent, not forgetting the desirability of information of the set and drift of current, ice, and navigational obstructions being included in reports intended for "all ships," but not through W/T stations for certain meteorological centres. In such cases, brevity being desirable, only the first four or universal groups should be given in code. This ensures the necessary brevity and information for the meteorological centre, and the necessary information for ships at sea. Do not include information in C.W. reports addressed to meteorological centres which they do not require.

Second. On Form 138, the register for coded "Selected Ships" wireless meteorological reports, in No. 1 column write the address of the Meteorological Centre if your ship is fitted for C.W. transmission, but "All Ships' Weather" if Spark.

Universal Groups.

With the Code Card, Form 138A, from synchronized weather observations entered on Form 911 or 915, code as follows :—

		Key Letters.
Column	2.—Code the Day of the Week. Table I ...	P
,,	3.—Code the Octant of the Globe. Table II ...	Q
,,	4.—Code the Latitude by entering the **whole degrees** (prefixing 0 if necessary to make up two figures); and dividing the minutes by six, neglecting the remainder. Enter the result	LLL
,,	5.—Code the Longitude by entering the **whole degrees** (prefixing 0 if necessary to make up two figures, or omitting the initial 1 if Longitude is 100° or over). Divide the minutes by six, neglecting the remainder. Enter the result	lll
,,	6.—Enter the hours of the Greenwich Mean Time of Observation	GG

From the Code Card Form 138A.

		Key Letters.
,,	7.—Code the Direction of the Wind. Table III	DD
,,	8.—Code the Force of the Wind, forces 9 and above are entered as 9, but if 10, 11 or 12, add the words Gale, Storm, or Hurricane at the end of the message. Table V ...	F
Column	9.—Code the Present Weather. Table VI ...	ww
,,	10.—Code the corrected barometer reading by entering the two last whole figures if a millibar barometer, or coding, if inches, by Table VIII	BB
,,	11.—Enter the Visibility by Scale. Table XII ...	V
,,	12.—Enter the Air Temperature in whole degrees Fahrenheit, omitting the initial 1, if over 100°	TT

No. 3 Supplementary Groups.

If these groups have been decided upon, in Column 13 enter "3" as distinguishing number for the remainder of the coded message.

		Key Letters.
Column	14.—Code type of Lower Cloud. Table XIII ...	C_L
,,	15.—Code type of Middle Cloud. Table XIV ...	C_M
,,	16.—Code type of Upper Cloud. Table XV ...	C_H
,,	17.—Code the total amount of sky covered. Table XVII	N
,,	18.—Subtract the lesser from the greater of the Air and Sea Temperatures and code the result with Table XVIII	t_d
,,	19.—Enter the Swell by Scale. Table XIX ...	K
,,	20.—Code the True Direction of Swell. Table IV	d
,,	21.—Code the Past Weather. Table VII ...	W
,,	22.—Code the proportion of sky covered with Lower Cloud. Table XVII	N_L
,,	23.—Code the course of ship. Table IV	d_s
,,	24.—Code the speed of the ship. Table XX ...	f
,,	25.—Code the characteristic of the Tendency of the Barometer, as shown by barograph Table X	a
,,	26.—Code the Amount of rise or fall of the Barometer in the last 3 hours. Table XI ...	bb

No. 6. Supplementary Groups.

If these groups have been decided upon, in Column 27 enter "6" as distinguishing number for the remainder of the coded message.

		Key Letters.
Column	28.—Enter the Swell by Scale. Table XIX ...	K
,,	29.—Code the True Direction of the Swell. Table IV	d
,,	30.—Code the Predominating type of Cloud. Table XVI	C
,,	31.—Code the total amount of sky covered. Table XVII	N
,,	32.—Subtract the lesser from the greater of the Air and Sea Temperatures and code the result. Table XVIII	t_d
,,	33.—Code the Course of the Ship. Table IV ...	d_s
,,	34.—Code the recorded change of the barometer in the last two, three, or four hours. Table IX	A
,,	35.—Code the Past Weather. Table VII ...	W
,,	36.—Code type of Upper Cloud. Table XV ...	C_H

For messages which are to be broadcast to **C.Q.** or made to shore services indicated in the list of W/T stations in The Marine Observer as requiring such information, in Column 37, enter briefly in plain language the set and drift of current experienced, with position **from** and **to,** Ice or other navigational obstructions.

On no account should such information be entered in messages for shore services that do not require it.

The ship's call sign should be given in the usual way in sending the report.

In Column 38.—After the message has been despatched enter the call sign of the station through which it was sent, with wave length, or **C.Q.,** as the case may be.

In Column 39.—After the message is sent enter the exact time (G.M.T.) of despatch.

Be sure that your message is correctly coded, and that you have not duplicated the Supplementary Groups.

Write out the message on the signal pad (Form 139) provided and send to the wireless operator for despatch in accordance with instructions given in World Wide System of Voluntary Selected Ship Routine Wireless Weather Reports, pages 28 to 32, schedule for which is also given on Code Card Form 138A.

CODE TABLES.

Day and Position.

Table 1.

P.—Day of the Week.

	Code Figure.		Code Figure.
Sunday	1	Thursday	5
Monday	2	Friday	6
Tuesday	3	Saturday	7
Wednesday	4		

Table II.

Q.—Octant of the Globe.

	Longitude.	Code Figure.
North Latitude.	0° W. — 90° W....	0
	90° W. — 180° W....	1
	180° E. — 90° E.	2
	90° E. — 0° E.	3
South Latitude.	0° W. — 90° W....	5
	90° W. — 180° W....	6
	180° E. — 90° E.	7
	90° E. — 0° E.	8

Compass.

Table III.

DD.—Compass Table for Wind Direction to points.

True Direction.	Code Figures.	True Direction.	Code Figures.
Calm	00	S. by W.	17
N. by E.	01	S.S.W.	18
N.N.E.	02	S.W. by S.	19
N.E. by N.	03	S.W.	20
N.E.	04	S.W. by W.	21
N.E. by E.	05	W.S.W.	22
E.N.E.	06	W. by S.	23
E. by N.	07	W.	24
E.	08	W. by N.	25
E. by S.	09	W.N.W.	26
E.S.E.	10	N.W. by W.	27
S.E. by E.	11	N.W.	28
S.E.	12	N.W. by N.	29
S.E. by S.	13	N.N.W.	30
S.S.E.	14	N. by W.	31
S. by E.	15	N.	32
S.	16		

Table IV.

d and d_s.—Compass Table to Half Cardinal Points.

True Direction.	Code Figure.
No Sea or Swell; or Ship hove to	0
N.E.	1
E.	2
S.E....	3
S.	4
S.W.	5
W.	6
N.W.	7
N.	8
No observation or no information	9

Wind.

Table V.

F.—Wind Force, Beaufort Scale.

Beaufort Number.		Code Figure.
Nought.	Calm	0
One.	Light airs	1
Two.	Light breeze	2
Three.	Gentle breeze	3
Four.	Moderate breeze	4
Five.	Fresh breeze	5
Six.	Strong breeze	6
Seven.	Moderate gale	7
Eight.	Fresh gale	8
Nine.	Strong gale	9
Ten.	Whole gale	9 Gale*
Eleven.	Storm	9 Storm*
Twelve.	Hurricane	9 Hurricane*

* These words to be written at end of weather message.

Weather.

Table VI.

ww.—Present Weather. (Abridged for British Ships.)

	Code Figures.
Cloudless	00
Partly cloudy	01
Cloudy	02
Overcast	03
Haze (but visibility greater than one mile)	05
Distant Lightning	07
Mist	08
Precipitation within sight	10
Thunder, without precipitation at the ship or station ...	11
Ugly threatening appearance of sky	13
Squally weather	14
Heavy Squalls in last three hours	15
Waterspout seen in last three hours	16
Signs of a tropical storm forming	18
Signs that a tropical storm has formed	19
Precipitation (rain, drizzle, hail, snow or sleet) in last hour, but not at time of observation	20
Dust or Sand storm	30
Fog	40
Moderate fog in last hour	41
Thick fog in last hour	42
Fog in patches	49
Drizzle	50
Drizzle and Fog	57
Slight or moderate drizzle and rain	58
Thick drizzle and rain	59
Rain	60
Rain and fog	67
Slight or moderate rain and snow	68
Heavy rain and snow	69
Snow or Sleet	70
Shower or showers	80
Showers of slight or moderate hail, or rain and hail	88
Showers of heavy hail, or rain and hail	89
Thunderstorm	90

Preference should be given to 18 and 19 when they apply, otherwise to the largest number of this code which applies to the weather at the position of the ship at the time of observation.

Table VII.

W.—Past Weather.

	Code Figure.
Fair (clear or slightly clouded)	0
Variable sky	1
Mainly overcast	2
Fog or thick dust haze (visibility less than five cables) ...	3
Drizzle	4
Rain	5
Snow or sleet	6
Showers	7
Sandstorm or duststorm	8
Thunderstorm	9

Barometer.

Table VIII.

B.—Code Table for corrected barometer readings in millibars and inches.

(Adapted for British Ships.)

Mb.	In.	Code Figs.	Mb.	In.	Code Figs.	Mb.	In.	Code Figs.	Mb.	In.	Code Figs.
925	27·32	25	960	28·35	60	995	29·38	95	1025	30·27	25
926	27·35	26	961	28·38	61	996	29·41	96	1026	30·30	26
927	27·38	27	962	28·41	62	997	29·44	97	1027	30·33	27
928	27·41	28	963	28·44	63	998	29·47	98	1028	30·36	28
929	27·44	29	964	28·47	64	999	29·50	99	1029	30·39	29
930	27·46	30	965	28·50	65	1000	29·53	00	1030	30·42	30
931	27·49	31	966	28·53	66	1001	29·56	01	1031	30·45	31
932	27·52	32	967	28·56	67	1002	29·59	02	1032	30·48	32
933	27·55	33	968	28·59	68	1003	29·62	03	1033	30·51	33
934	27·58	34	969	28·62	69	1004	29·65	04	1034	30·53	34
935	27·61	35	970	28·65	70	1005	29·68	05	1035	30·56	35
936	27·64	36	971	28·67	71	1006	29·71	06	1036	30·59	36
937	27·67	37	972	28·70	72	1007	29·74	07	1037	30·62	37
938	27·70	38	973	28·73	73	1008	29·77	08	1038	30·65	38
939	27·73	39	974	28·76	74	1009	29·80	09	1039	30·68	39
940	27·76	40	975	28·79	75	1010	29·83	10	1040	30·71	40
941	27·79	41	976	28·82	76	1011	29·86	11	1041	30·74	41
942	27·82	42	977	28·85	77	1012	29·89	12	1042	30·77	42
943	27·85	43	978	28·88	78	1013	29·92	13	1043	30·80	43
944	27·88	44	979	28·91	79	1014	29·94	14	1044	30·83	44
945	27·91	45	980	28·94	80	1015	29·97	15	1045	30·86	45
946	27·94	46	981	28·97	81	1016	30·00	16	1046	30·89	46
947	27·97	47	982	29·00	82	1017	30·03	17	1047	30·92	47
948	28·00	48	983	29·03	83	1018	30·06	18	1048	30·95	48
949	28·03	49	984	29·06	84	1019	30·09	19	1049	30·98	49
950	28·05	50	985	29·09	85	1020	30·12	20	1050	31·01	50
951	28·08	51	986	29·12	86	1021	30·15	21	1051	31·04	51
952	28·11	52	987	29·15	87	1022	30·18	22	1052	31·07	52
953	28·14	53	988	29·18	88	1023	30·21	23	1053	31·10	53
954	28·17	54	989	29·21	89	1024	30·24	24	1054	31·13	54
955	28·20	55	990	29·24	90						
956	28·23	56	991	29·26	91						
957	28·26	57	992	29·29	92						
958	28·29	58	993	29·32	93						
959	28·32	59	994	29·35	94						

NOTE.—It will be seen that the code figures may represent two values of barometric pressure, but this only takes place with a very high or a very low barometer, so that recipients of a message will be able to decide which value is intended.

Table IX.

A—Change of Barometer in last 2, 3 or 4 hours.

(Adapted for British Ships.)

(The change in 3 hours should be given if possible.)

	In 2 hours.	In 3 hours.	In 4 hours.	Code Figure.
Barometer **steady**—Has not risen or fallen more than	0·3 mb. (·01 in.)	0·5 mb. (·01 in.)	0·7 mb. (·02 in.)	0
Barometer **rising slowly**—Has risen.	0·7–1·0 mb. (·02–·03 in.)	1·0–1·5 mb. (·03–·05 in.)	1·3–2·0 mb. (·04–·06 in.)	1
Barometer **rising**—Has risen	1·4–2·4 mb. (·05–·07 in.)	2·0–3·5 mb. (·06–·10 in.)	2·8–4·8 mb. (·08–·14 in.)	2
Barometer **rising quickly**—Has risen.	2·6–4·0 mb. (·08–·12 in.)	4·0–6·0 mb. (·12–·18 in.)	5·2–8·0 mb. (·15–·24 in.)	3
Barometer **rising very rapidly**—Has risen.	over 4·0 mb. (·12 in.)	over 6·0 mb. (·18 in.)	over 8·0 mb. (·24 in.)	4
Barometer **falling slowly**—Has fallen.	0·7–1·0 mb. (·02–·03 in.)	1·0–1·5 mb. (·03–·05 in.)	1·3–2·0 mb. (·04–·06 in.)	5
Barometer **falling** — Has fallen.	1·4–2·4 mb. (·05–·07 in.)	2·0–3·5 mb. (·06–·10 in.)	2·8–4·8 mb. (·08–·14 in.)	6
Barometer **falling quickly**—Has fallen.	2·6–4·0 mb. (·08–·12 in.)	4·0–6·0 mb. (·12–·18 in.)	5·2–8·0 mb. (·15–·24 in.)	7
Barometer **falling very rapidly**—Has fallen.	over 4·0 mb. (·12 in.)	over 6·0 mb. (·18 in.)	over 8·0 mb. (·24 in.)	8

Barograph.

Table X.

a.—Characteristic of changes of the Barometer in the last three hours.

(Adapted for British Ships.)

	Description of Changes.	Code Figure.
Net result, Barometer same or higher.	Barometer rising at first, then falling by a smaller or like amount	0
	Barometer rising at first, then steady or rising less quickly...	1
	Barometer unsteady, but generally rising or stationary	2
	Barometer steady or rising	3
	Barometer falling or steady at first, then rising by the same or larger amount	4
	Barometer rising, at an increasing rate	
Net result, Barometer lower.	Barometer falling at first, then rising by a smaller amount	5
	Barometer falling at first, then steady or falling less quickly	6
	Barometer unsteady, but falling	7
	Barometer falling	8
	Barometer steady or rising at first, then falling by a larger amount	9
	Barometer falling, at an increasing rate	

NOTE.—These changes can generally only be given by ships which have special barographs on board.

For illustration of these characteristic changes and guidance see MARINE OBSERVERS HANDBOOK, 5th Edition.

Table XI.

bb.—Amount of Rise or Fall of the Barometer in the last three hours.

(Adapted for British Ships.)

Amount of Rise or Fall.		Code Figs.	Amount of Rise or Fall.		Code Figs.	Amount of Rise or Fall.		Code Figs.	Amount of Rise or Fall.		Code Figs.
Mbs.	Inches.		Mbs.	Inches.		Mbs.	Inches.		Mbs.	Inches.	
0·2	·01	01	4·6	·14	23	9·0	·27	45	13·4	·40	67
0·4	·01	02	4·8	·14	24	9·2	·28	46	13·6	·41	68
0·6	·02	03	5·0	·15	25	9·4	·28	47	13·8	·41	69
0·8	·02	04	5·2	·16	26	9·6	·29	48	14·0	·42	70
1·0	·03	05	5·4	·16	27	9·8	·29	49	14·2	·43	71
1·2	·04	06	5·6	·17	28	10·0	·30	50	14·4	·43	72
1·4	·04	07	5·8	·17	29	10·2	·31	51	14·6	·44	73
1·6	·05	08	6·0	·18	30	10·4	·31	52	14·8	·44	74
1·8	·05	09	6·2	·19	31	10·6	·32	53	15·0	·45	75
2·0	·06	10	6·4	·19	32	10·8	·32	54	15·2	·46	76
2·2	·07	11	6·6	·20	33	11·0	·33	55	15·4	·46	77
2·4	·07	12	6·8	·20	34	11·2	·34	56	15·6	·47	78
2·6	·08	13	7·0	·21	35	11·4	·34	57	15·8	·47	79
2·8	·08	14	7·2	·22	36	11·6	·35	58	16·0	·48	80
3·0	·09	15	7·4	·22	37	11·8	·35	59	16·2	·49	81
3·2	·10	16	7·6	·23	38	12·0	·36	60	16·4	·49	82
3·4	·10	17	7·8	·23	39	12·2	·37	61	16·6	·50	83
3·6	·11	18	8·0	·24	40	12·4	·37	62	16·8	·50	84
3·8	·11	19	8·2	·25	41	12·6	·38	63	17·0	·51	85
4·0	·12	20	8·4	·25	42	12·8	·38	64	17·2	·52	86
4·2	·13	21	8·6	·26	43	13·0	·39	65	17·4	·52	87
4·4	·13	22	8·8	·26	44	13·2	·40	66			

Visibility.

Table XII.

V.—Visibility.

	Code Figure.
Dense fog. Objects not visible at 50 yards.	0
Thick fog. Objects not visible at 1 cable	1
Fog. Objects not visible at 2 cables	2
Moderate fog. Objects not visible at ½ mile (nautical) ...	3
Mist or haze, or very poor visibility. Objects not visible at 1 mile (nautical)	4
Poor visibility. Objects not visible at 2 miles (nautical) ...	5
Moderate visibility. Objects not visible at 5 miles (nautical)	6
Good visibility. Objects not visible at 10 miles (nautical) ...	7
Very good visibility. Objects not visible at 30 miles (nautical)	8
Excellent visibility. Objects visible more than 30 miles ...	9

Clouds.

Table XIII.

C_L.—Form of Low Cloud.

Form of Cloud.	Code Figure.
No low clouds	0
Cumulus of fine weather	1
Cumulus (Large, without anvil)	2
Cumulo-Nimbus	3
Strato-Cumulus (spread from Cumulus)	4
Stratus or Strato-Cumulus (in layer)	5
Scud	6
Cumulus **and** Strato-Cumulus of fine weather	7
Cumulus, large (or Cumulo-Nimbus) **and** Strato-Cumulus	8
Cumulus, large (or Cumulo-Nimbus) **and** Scud	9

Table XIV.

C_M.—Form of Middle Cloud.

Form of Cloud.	Code Figure.
No middle cloud	0
Alto-Stratus, typical thin	1
Alto-Stratus, typical thick (Sun or Moon invisible), or Nimbo-Stratus	2
Alto-Cumulus or high Strato-Cumulus, single layer	3
Alto-Cumulus, in bands, decreasing	4
Alto-Cumulus, in bands, increasing	5
Alto-Cumulus, spread out from Cumulus	6
Alto-Cumulus with Alto-Stratus; or Alto-Stratus with parts resembling Alto-Cumulus	7
Alto-Cumulus Castellatus (Alto-Cumulus in ragged fragments)	8
Alto-Cumulus in several layers, generally with fibrous veils and chaotic appearance of sky	9

Table XV.

C_H.—Form of Upper Cloud (Cirrus Cloud).

Form of Cloud.	Code Figure.
No upper clouds (cirrus type)	0
Cirrus, fine, not increasing; scarce	1
Cirrus, fine, not increasing; plentiful, but not a continuous layer	2
Cirrus, anvil	3
Cirrus, fine, increasing	4
Cirrus or Cirro-Stratus increasing, below 45° altitude	5
Cirrus or Cirro-Stratus increasing, and reaching above 45° altitude	6
Cirro-Stratus veil covering whole sky	7
Cirrus-Stratus, not increasing, and not covering whole sky	8
Cirro-Cumulus predominating, and a little Cirrus	9

Table XVI.

C.—Predominating Form of Cloud.

Form of Cloud.	Code Figure.
Cirrus	1
Cirro-Stratus	2
Cirro-Cumulus	3
Alto-Cumulus	4
Alto-Stratus	5
Strato-Cumulus	6
Nimbo-Stratus	7
Cumulus or Fracto-Cumulus	8
Cumulo Nimbus	9
Stratus or Fracto-Stratus	0

Table XVII.

N. and (N_L).—Amount of Cloud.

Proportion of Sky covered, in tenths.	Code Figure.
0	0
Less than 1	1
1	2
2 to 3	3
4 to 6	4
7 to 8	5
9	6
More than 9, but with openings	7
10, completely covered	8
Sky obscured by fog, duststorm or other phenomenon	9

Temperatures.

Table XVIII.

t_d.—Difference between Air and Sea Surface Temperature.

	Code Figure.
Air Temperature **higher** than Sea Temperature.	
More than 9° Fahrenheit	0
6° to 9° ,,	1
3° to 6° ,,	2
1° to 3° ,,	3
0° to 1° ,,	4
Air Temperature **lower** than Sea Temperature.	
0° to 1° Fahrenheit	5
1° to 3° ,,	6
3° to 6° ,,	7
6° to 9° ,,	8
More than 9° ,,	9

Swell.

Table XIX.

K.—Swell.

	Code Figure.
No swell	0
Low swell, short or average length	1
Low swell, long	2
Moderate swell, short	3
Moderate swell, average length	4
Moderate swell, long	5
Heavy swell, short	6
Heavy swell, average length	7
Heavy swell, long	8
Confused swell	9

Speed.

Table XX.

f.—Speed of Ship.

Speed in Knots.	Code Figure.
Ship stopped	0
1 to 3 knots	1
4 to 6 ,,	2
7 to 9 ,,	3
10 to 12 ,,	4
13 to 15 ,,	5
16 to 18 ,,	6
19 to 21 ,,	7
22 to 24 ,,	8
More than 24 knots	9

PERSONNEL.

The Marine Superintendent will be glad to receive information of distinctions gained and retirements, &c., of Marine Observers.

Captain James Gillies, C.B.E.

Captain James Gillies, who has retired from the position of General Manager of the Canadian Pacific Steamships Ltd. in London on account of ill-health, has had a long and distinguished career in the Merchant Navy.

He joined the Canadian Pacific Steamship Co. in 1903 when the Elder Dempster Atlantic ships in which he was then serving were transferred to the Canadian Pacific flag. In 1907 he was promoted to his first command and at the time of his appointment to the post of General Manager in 1925 was commanding the R.M.S. *Empress of Scotland* and was Commodore of the Canadian Pacific Atlantic Fleet.

Captain F. W. Holt, M.B.E.

Captain F. W. Holt, Commander of the Southern Railway steamer *Isle of Jersey*, has retired after 44 years' sea service.

Captain Holt commenced his sea career in 1891, when he was apprenticed to Messrs. Roxburgh & Co., of Glasgow, serving his time in their four-masted barque *Carradale*. On completing his apprenticeship he served in the same company's ship *Clydesdale* as second mate, and after six years' experience in sail transferred to steam, joining the Donaldson Line employed in the Trans North Atlantic trade.

In 1902 he transferred to the London and South Western Railway Steamship service as second mate of the S.S. *Hilda*, employed on the St. Malo run. Three years later he was appointed to command the cargo steamer *Cherbourg*, since when he has held command of every Southern Railway passenger vessel running out of Southampton with the exception of the *Sarnia*.

During the war Captain Holt ran almost every night between Southampton and Havre, and received the M.B.E. for his war services.

Captain Robert Gilmore Latta

Captain Robert Gilmore Latta, who on his retirement from service afloat, was appointed General Superintendent of the Canadian Pacific Steamships Ltd. in Montreal, has been promoted to succeed Captain Gillies as General Manager in London.

Captain Latta joined the Canadian Pacific Steamships as a junior officer in 1904 and at the time of his retirement from the sea in 1934 was commander of the R.M.S. *Empress of Britain* and was Commodore of the Canadian Pacific North Atlantic Fleet.

A memoir on Captain Latta's sea service was published in The Marine Observer of January, 1935.

Vice-Admiral Sir Robert Mansell, K.C.V.O., C.B.E.

Vice-Admiral Sir Robert Mansell, who has recently retired because of ill-health from the office of Deputy-Master of the Trinity House, has had a long and distinguished career in connection with the sea since he entered the Royal Navy in 1881.

He was promoted to the rank of Commander in 1902 and that of Captain in 1907. He retired from the Navy on his election as an Elder Brother of the Trinity House in 1912.

At the outbreak of war he returned to active service in the Navy and at one time was in charge of the Royal Naval College at Keyham.

In 1918 he was promoted Rear-Admiral and once more resumed his duties as an active Elder Brother. In 1924 he was further promoted to the rank of Vice-Admiral.

On the death of Sir Acton Blake in 1926, Admiral Mansell was elected to succeed him as Deputy-Master of the Trinity House.

During his period of office he not only carried out the duties and responsibilities connected therewith with conspicuous success. but he has also identified both himself and the Trinity House with every effort which has been made to benefit the seafaring profession.

For many years he has acted as Chairman of the Distribution Committee and is still Deputy-Chairman of the General Council of King George's Fund for Sailors.

He was created a C.B.E. in 1919 and K.C.V.O. in 1930.

Captain A. R. H. Morrell.

Captain A. R. H. Morrell was elected Deputy-Master of the Trinity House on 1st October, 1935, in succession to Admiral Mansell.

Educated at Bedford School, he served his apprenticeship in the sailing ships of Messrs. Shaw Savill and Albion.

He was Second Mate and Mate of the ship *Mountstuart*, and then after a short period in the R.M.S.P. Co., joined the service of the West India and Panama Cable Company, with whom he remained for 19 years, during 16 of which he was in command. His last sea-going command was the cable ship *Henry Holmes*.

He was elected to the Trinity House as a Younger Brother in 1916, and upon the retirement of Captain A. S. Thomson in 1922, he was elected Elder Brother.

In 1929 at the International Conference for Safety of Life at Sea, Captain Morrell was one of the two master mariners—the other being the late Captain F. W. Bate, Professional Member B. of T.—on the British delegation of 10, which represented the Government of the United Kingdom and Northern Ireland, the whole conference being presided over by Vice-Admiral Sir Herbert Richmond.

One of the original members, he has been a Warden of the Honourable Company of Master Mariners for some years, and has taken a leading part with Admiral Mansell and his Brethren of the Corporation in many efforts to benefit the seafaring profession in general, and the merchant navy especially.

For a year before becoming an Elder Brother, Captain Morrell was a member of the Corps of Voluntary Marine Observers when post-war reorganization was being vigorously pressed.

The Corps of Voluntary Marine Observers and the Marine Division wish Captain Morrell success in this post of great responsibility in administering the services of the Trinity House.

OBITUARY.

The death of Captain William Henry Parker, C.B.E., R.D., R.N.R., at his home, Dene Croft, Woking, suddenly on Wednesday, 6th November, 1935, is noted with regret.

Captain Parker's—formerly of the P.S.N. Company and R.M.S.P. Co.—last command was R.M.S. *Olympic* of the White Star Line, from which he retired on 31st December, 1929.

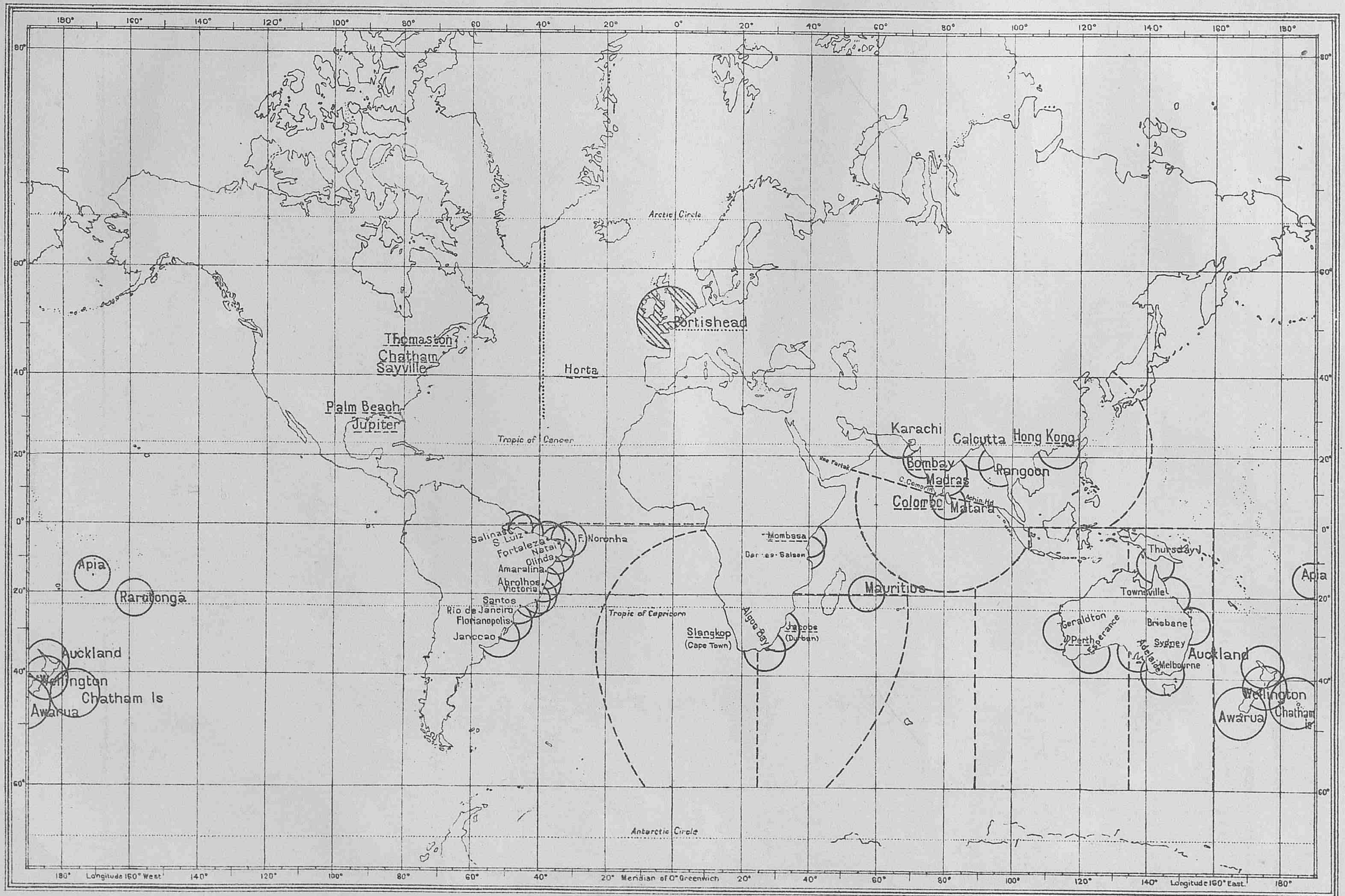
He was a member of the Voluntary Corps of Marine Observers for many years, and since his retirement has continued his interest in the work and given valuable assistance and support.

A memoir upon his career, by one of his officers, may be found in No. 82, Vol. VII of The Marine Observer (December, 1930).

The death of Captain Thomas Spence, late commander of the R.M.S. *Apapa*, which took place at Liverpool on October 30th last, is noted with regret.

After serving for some years in sail, Captain Spence transferred to steam, and had held command of the steamers *Aoma*, *Strathord*, *Hermiston*, and *Beechley* before joining Messrs. Elder Dempster & Co., in 1906. Four years later he obtained command in his new employ and has in the intervening twenty-five years had in his charge a number of vessels of the Elder Dempster fleet.

SHIPS' WIRELESS WEATHER SIGNALS.
CHART OF THE WORLD.
Stations for Reception of Routine Wireless Weather Reports from "Selected Ships".



Arctic Circle
Tropic of Cancer
Tropic of Capricorn
Antarctic Circle
Longitude 160° West
Meridian of 0° Greenwich
Longitude 160° East
Portishead
Thomaston
Chatham
Sayville
Palm Beach
Jupiter
Horta
Karachi
Calcutta
Hong Kong
Bombay
Madras
Rangoon
C. Comorin
Ras Fartak
Achin Hd
Colombo
Matara
Salinas
S. Luiz
Fortaleza
Natal
Olinda
Amaralina
Abrolhos
Victoria
Santos
Rio de Janeiro
Florianopolis
Jancção
F. Noronha
Mombasa
Dar-es-Salaam
Mauritius
Slangkop (Cape Town)
Algoa Bay
Jacobs (Durban)
Apia
Rarotonga
Auckland
Wellington
Chatham Is
Awarua
Thursday I.
Townsville
Brisbane
Sydney
Adelaide
Melbourne
Geraldton
Perth
Esperance
Chatham Is

┈┈┈┈ *The dotted line indicates the area in which British "A Selected Ships" report under control to Portishead.*

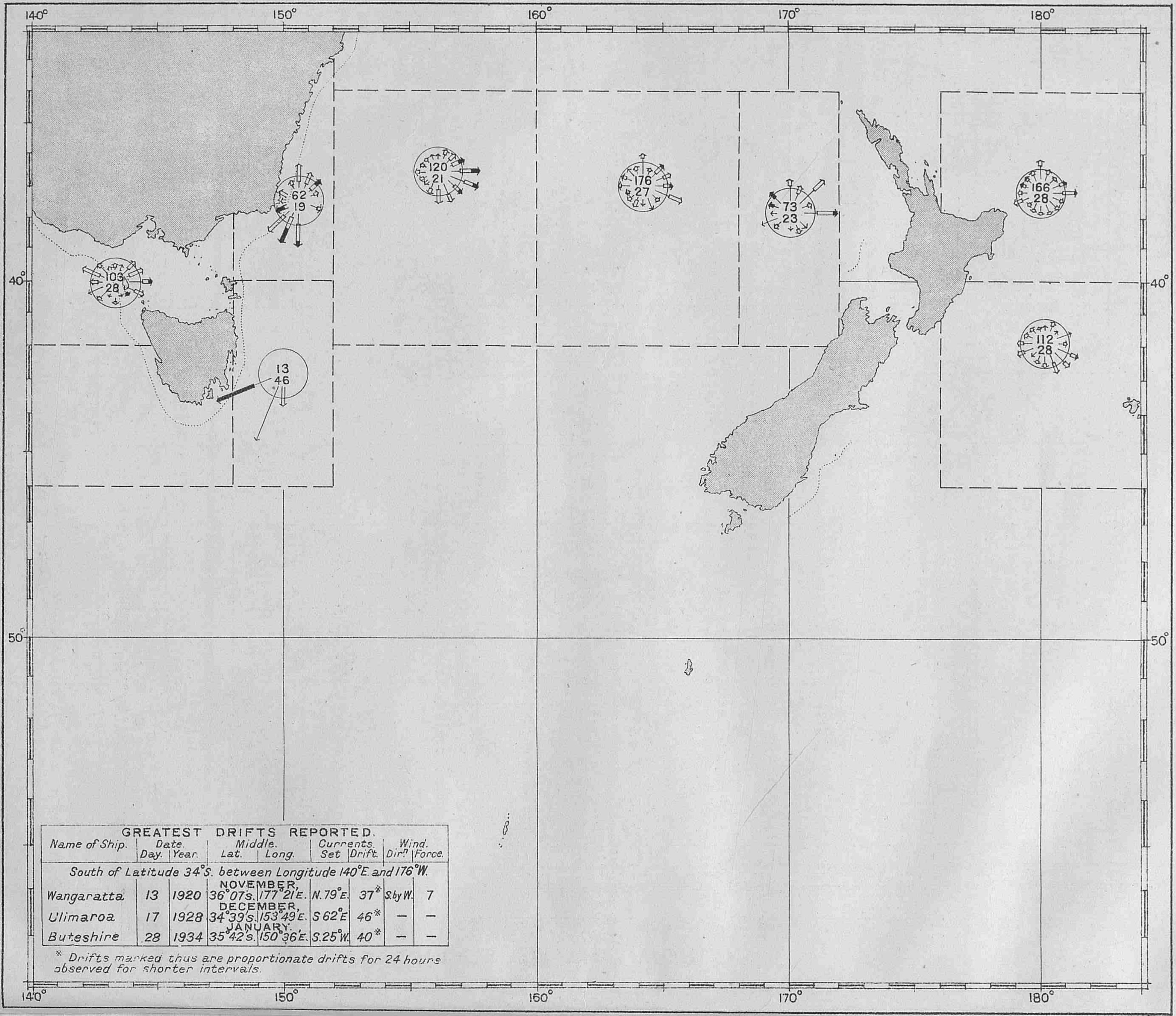
– – – – *A pecked line indicates the reporting area for stations in other countries to which British "A Selected Ships" should report. The names of such stations being underlined with a pecked line.*

▨ *The small shaded areas round stations detailed to receive reports from "A Selected Ships" indicate where these ships should not report on account of congestion.*

○ *The full circles indicate the areas round islands and coast stations which are detailed to intercept "B Selected Ships" reports made to C.Q. on 600 metres.*

CURRENTS IN THE SOUTHERN PORTION OF THE SOUTH PACIFIC.
(Western)
NOVEMBER DECEMBER and JANUARY.

Observations of ships regularly observing for the British Meteorological Office, 1910-1935.

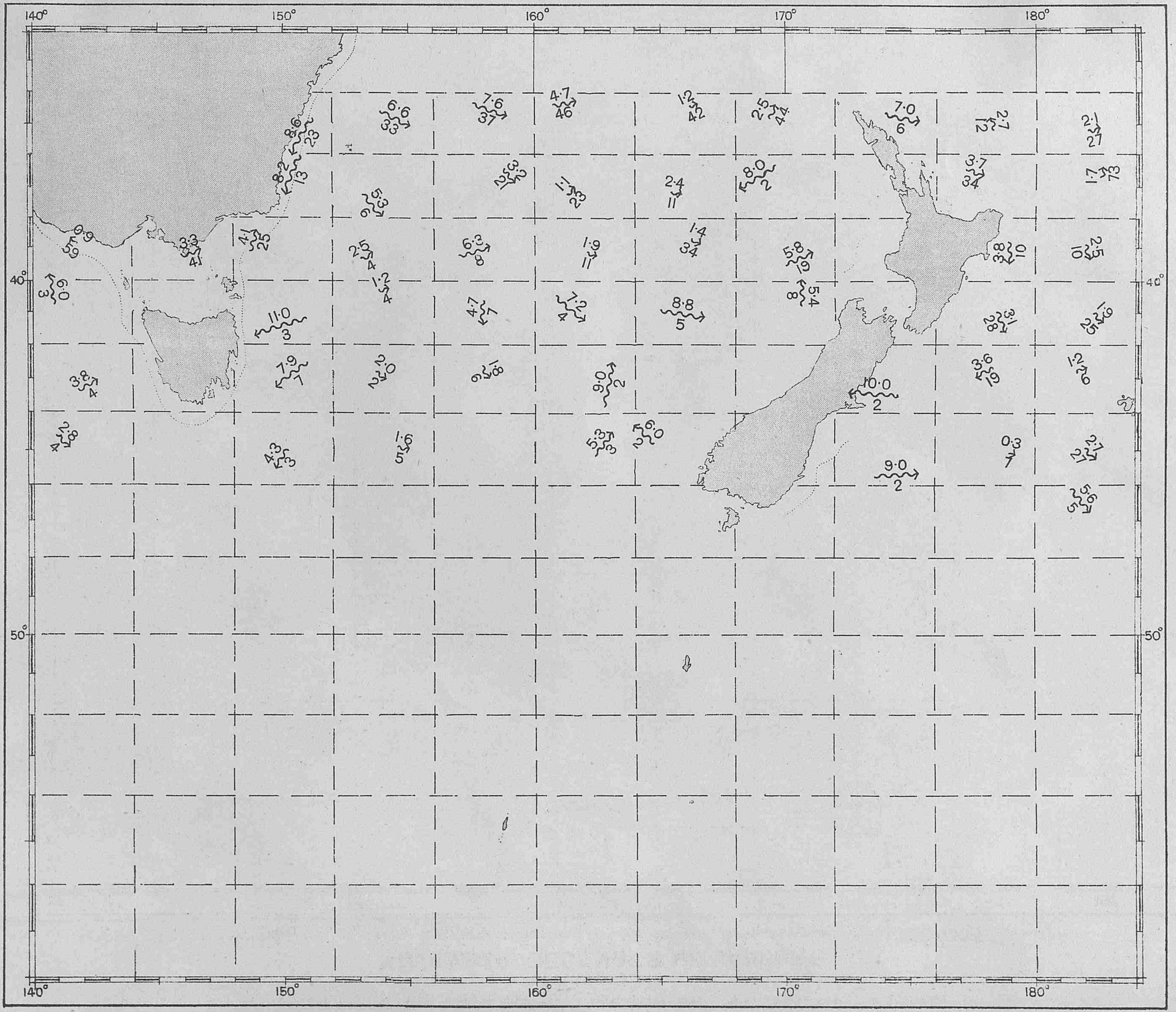

140°
150°
160°
170°
180°
40°
50°
62
19
120
21
176
27
73
23
166
28
103
28
13
46
112
28

GREATEST DRIFTS REPORTED.								
Name of Ship.	Date.		Middle.		Currents.		Wind.	
	Day.	Year.	Lat.	Long.	Set	Drift.	Dirn.	Force.
South of Latitude 34°S. between Longitude 140°E. and 176°W.								
			NOVEMBER,					
Wangaratta	13	1920	36° 07' S.	177° 21' E.	N. 79° E.	37*	S. by W.	7
			DECEMBER,					
Ulimaroa	17	1928	34° 39' S.	153° 49' E.	S 62° E	46*	—	—
			JANUARY.					
Buteshire	28	1934	35° 42' S.	150° 36' E.	S. 25° W.	40*	—	—

* Drifts marked thus are proportionate drifts for 24 hours observed for shorter intervals.

CURRENTS IN THE SOUTHERN PORTION OF THE SOUTH PACIFIC.
(Western)
NOVEMBER DECEMBER and JANUARY.

Observations of ships regularly observing for the British Meteorological Office. 1910-1935.

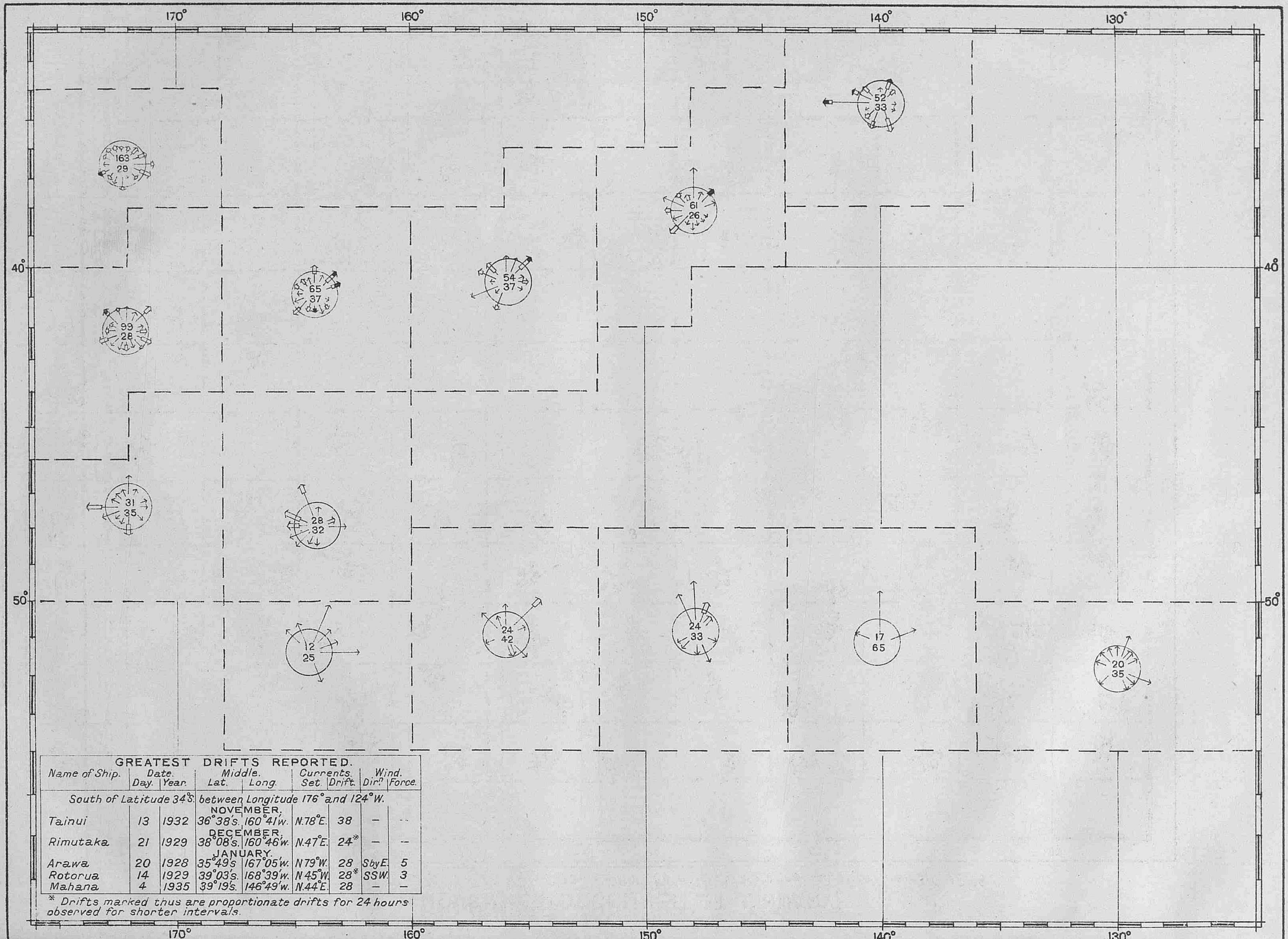

140°
150°
160°
170°
180°
40°
50°
6·6
33
7·6
37
4·7
46
1·2
42
2·5
44
7·0
6
2·7
12
2·1
27
8·6
23
8·2
13
5·3
6
3·2
25
1·1
23
2·4
11
8·0
2
3·7
34
1·7
13
0·9
59
3·3
41
4·1
25
2·5
4
6·3
8
1·9
11
1·4
34
5·8
19
3·8
10
2·5
10
6·0
3
1·2
4
11·0
3
4·7
7
7·2
4
8·8
5
5·4
8
3·1
28
1·9
25
7·9
7
2·0
2
6·8
9
9·0
2
10·0
2
3·6
19
1·2
26
3·8
4
2·8
4
4·3
3
1·6
5
5·3
3
6·0
2
9·0
2
0·3
1
2·7
27
5·6
5

CURRENTS IN THE SOUTHERN PORTION OF THE SOUTH PACIFIC.

(Middle)

NOVEMBER DECEMBER and JANUARY.

Observations of ships regularly observing for the British Meteorological Office, 1910-1935.


170°
160°
150°
140°
130°
40°
50°
163
29
52
33
61
26
65
37
54
37
99
28
31
35
28
32
12
25
24
42
24
33
17
65
20
35

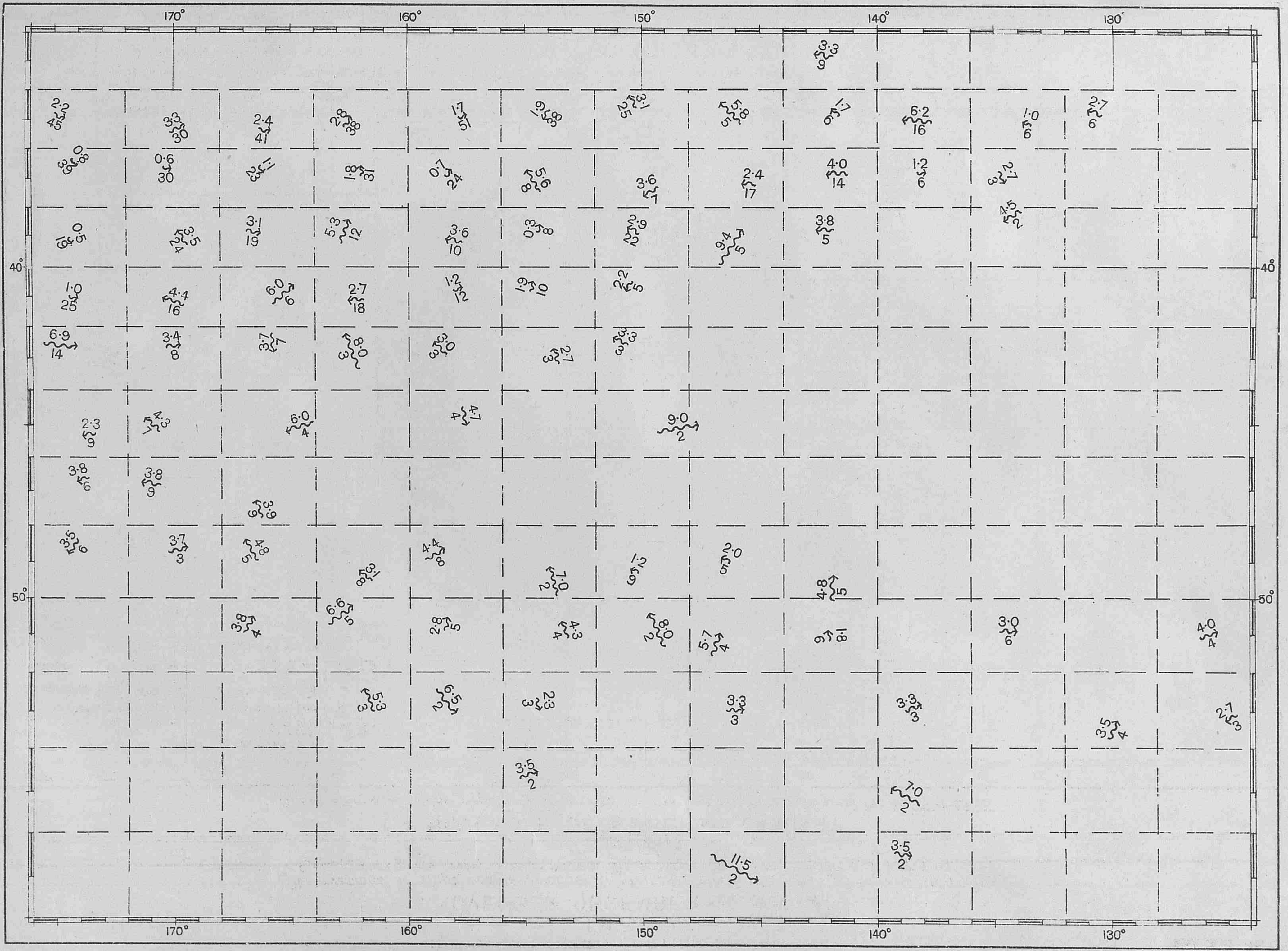
GREATEST DRIFTS REPORTED.

Name of Ship.	Date.		Middle.		Currents.		Wind.	
	Day.	Year.	Lat.	Long.	Set.	Drift.	Dirⁿ.	Force.
South of Latitude 34°S. between Longitude 176° and 124°W.								
NOVEMBER.								
Tainui	13	1932	36°38′s.	160°41′w.	N.78°E.	38	—	--
DECEMBER.								
Rimutaka	21	1929	38°08′s.	160°46′w.	N.47°E.	24*	—	--
JANUARY.								
Arawa	20	1928	35°49′s	167°05′w.	N 79°W.	28	S by E.	5
Rotorua	14	1929	39°03′s.	168°39′w.	N 45°W.	28*	SSW.	3
Mahana	4	1935	39°19′s.	146°49′w.	N.44°E.	28	—	—

* Drifts marked thus are proportionate drifts for 24 hours observed for shorter intervals.

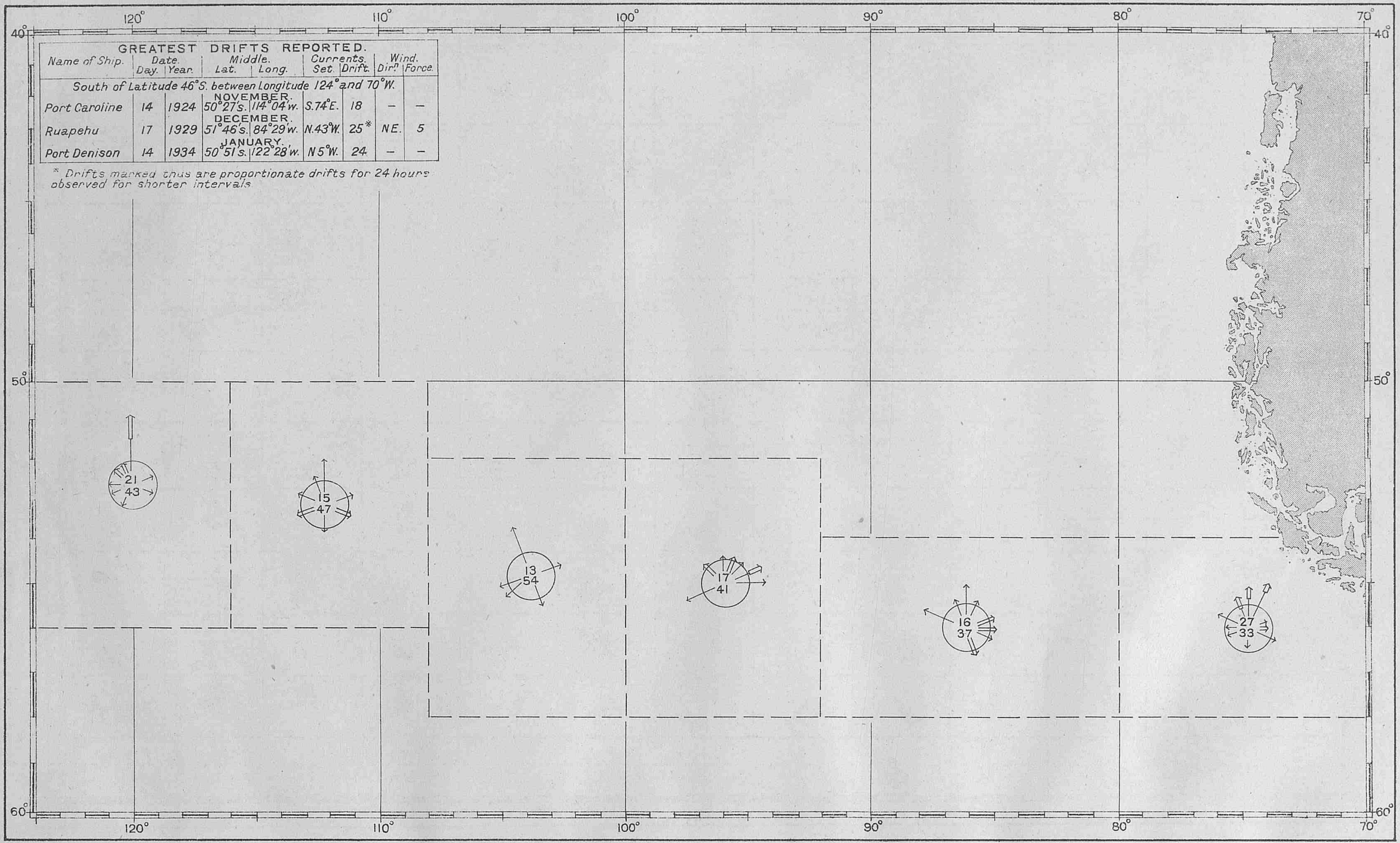
Currents in the Southern Portion of the South Pacific.
(Middle)
NOVEMBER DECEMBER and JANUARY.

Observations of ships regularly observing for the British Meteorological Office, 1910-1935.


170°
160°
150°
140°
130°
40°
50°

CURRENTS IN THE SOUTHERN PORTION OF THE SOUTH PACIFIC.
(Eastern)
NOVEMBER DECEMBER and JANUARY.

Observations of ships regularly observing for the British Meteorological Office, 1910-1935.



GREATEST DRIFTS REPORTED.

Name of Ship.	Date.		Middle.		Currents.		Wind.	
	Day.	Year.	Lat.	Long.	Set.	Drift.	Dirn.	Force.
South of Latitude 46°S. between Longitude 124° and 70°W.								
NOVEMBER.								
Port Caroline	14	1924	50°27′s.	114°04′w.	S.74°E.	18	–	–
DECEMBER.								
Ruapehu	17	1929	51°46′s.	84°29′w.	N.43°W.	25*	N.E.	5
JANUARY.								
Port Denison	14	1934	50°51′s.	122°28′w.	N 5°W.	24	–	–

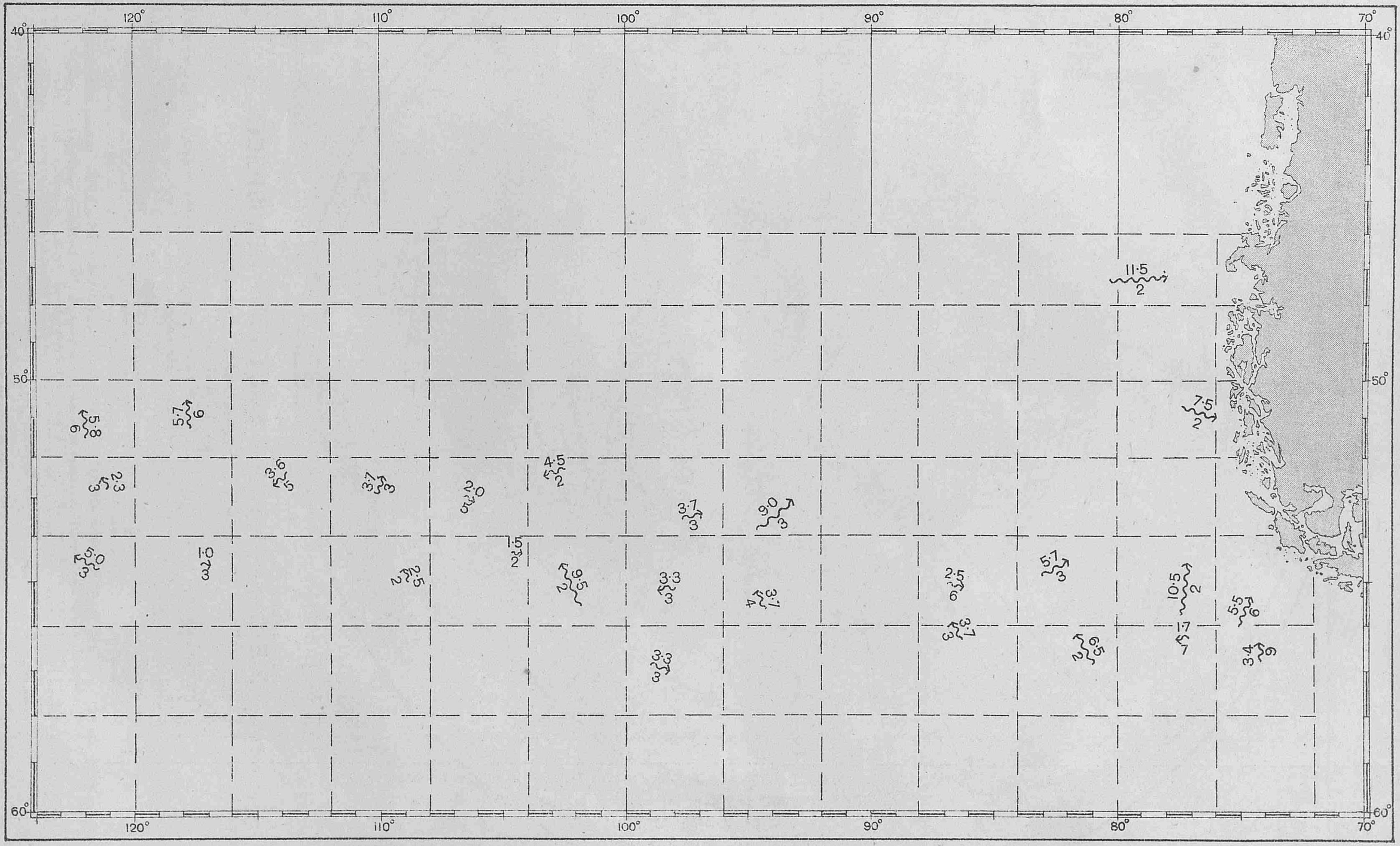
* Drifts marked thus are proportionate drifts for 24 hours observed for shorter intervals

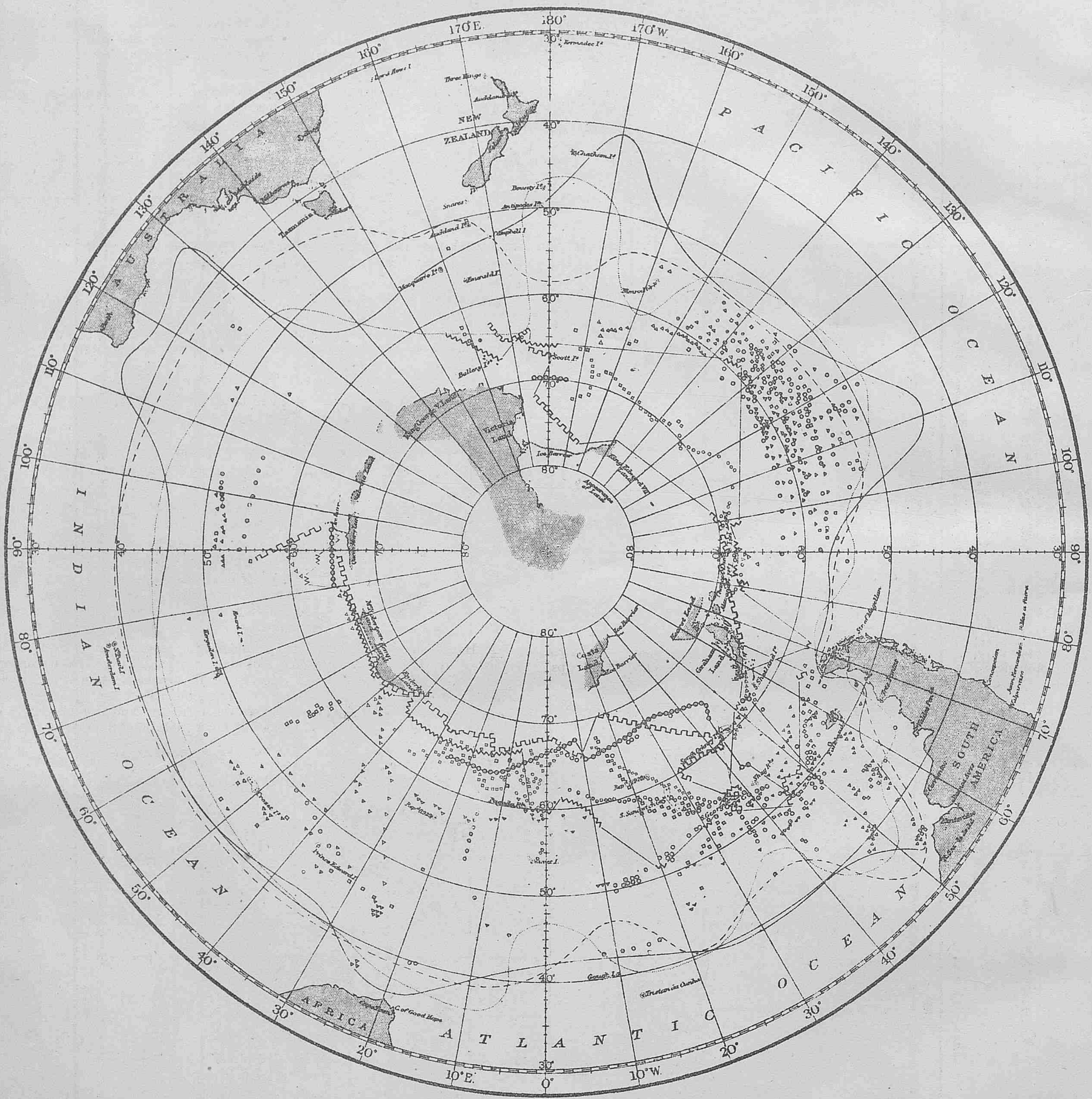
CURRENTS IN THE SOUTHERN PORTION OF THE SOUTH PACIFIC.

(Eastern)

NOVEMBER DECEMBER and JANUARY.

Observations of ships regularly observing for the British Meteorological Office, 1910-1935.


120°
110°
100°
90°
80°
70°
40°
50°
60°
11·5 2
7·5 2
5·8 6
5·7 6
2·3 3
3·6 5
3·7 3
2·0 5
4·5 2
3·7 3
9·0 3
1·5 2
5·0 3
1·0 3
2·5 2
9·5 2
3·3 3
3·7 4
3·3 3
2·5 6
3·7 3
5·7 3
6·5 2
10·5 2
1·7 1
5·5 6
3·4 6


180°
170°E.
170°W.
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
60°
50°
40°
30°
20°
10°E.
0°
10°W.
Kermadec Is
Lord Howe I
Three Kings
Auckland
NEW ZEALAND
Chatham Is
Bounty Is
Snares
Antipodes Is
Auckland Is
Campbell I
Macquarie Is
Emerald I
Balleny Is
Scott I
Victoria Land
Ice Barrier
King Edward VII Land
Coats Land
Graham Land
S. Shetland Is
S. Orkney Is
S. Georgia
S. Sandwich Is
Bouvet I
Gough I
Tristan da Cunha
C. of Good Hope
Capetown
Prince Edward Is
Crozet Is
Kerguelen I
Heard I
St. Paul I
Amsterdam I
Tasmania
Str. of Magellan
Falkland Is
Juan Fernandez
Mas a Fuera
Valparaiso
AUSTRALIA
AFRICA
SOUTH AMERICA
PACIFIC OCEAN
INDIAN OCEAN
ATLANTIC OCEAN

ICE CHART OF THE SOUTHERN HEMISPHERE,

JANUARY, FEBRUARY and MARCH.

EXPLANATION.

The symbols used to distinguish the ice of each of the three months are as follows:-

	Bergs, 1902-1935.	*Position of northernmost pack ice actually observed 1885-1935.*	*Extreme limit of all ice, 1772-1935.*
January.	△	〰〰〰〰	————
February.	□	⊓⊓⊓⊓⊓	- - - - -
March.	○	-o-o-o-o-	·········

Note — The symbols for pack ice are joined by hair line where desirable.

The coast line of the Antarctic continent as shown on this chart is not completely corrected to accord with the latest survey information. It is intended in a later volume of The Marine Observer, after the Admiralty Ice chart of the Southern Hemisphere Nº 1241 has been revised, to again publish this chart in The Marine Observer with coast lines as complete as possible and to bring the ice information up to date annually.

H.M.Stationery Office Press, Kingsway. W.C.2.

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